The FY 1985 Department of Defense Program for Research, Development and Acquisition

Statement
by the Honorable
Richard D. DeLauer
Under Secretary of Defense,
Research and Engineering,
to the 98th Congress
Second Session, 1984

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THE FY 1985 DEPARTMENT OF DEFENSE PROGRAM FOR
RESEARCH, DEVELOPMENT AND ACQUISITION

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I. INTRODUCTION TO THE FY 1985 RD&A BUDGET AND PROGRAM

Mr. Chairman and Members of the Committee:

A. STRUCTURE OF THE ACQUISITION PROGRAM

Three years ago, this Administration established fundamental management reform in the Department of Defense focused on coordinated planning, programming, and budgeting; improvement of the acquisition process; and provision of greater program stability.

The FY 1985 RD&A budget request of $142 billion is the means with which we propose to fund programs to continue essential modernization of our deployed forces. We propose improvements in both the hardware in use by our dedicated men and women in the field, in the process used to acquire this equipment, and in the necessary support structure.

The FY 1985 Acquisition Program, which I am privileged to review with you is our third report reflecting progress in this reform and in fulfilling our more fundamental pledge to arm America adequately against the present and future threat. This year's budget proposal is structured to provide needed capabilities which can be achieved at prudent cost. It reflects sound management of our limited resources, and efficient investment in cross-Service and cross-command programs. It is focused on the highest priorities that the Department of Defense must address to satisfy the basic security objectives with which the Secretary of Defense is charged.

It is on this basis that we request your support of the FY 85 acquisition budget, as well as the associated program projections for the succeeding years.

In developing the acquisition budget, we carefully considered the global nature of the threats which confront us, the major missions we are assigned, and the need for constancy--which, as I emphasized last year, is the key to a stable, affordable, modernization program.

Four basic cosiderations underlie this program:

- First, it delivers mission capabilities consistent with long established national security policy. We cannot assume that we will be relieved of any of these missions.

- Second, it rests upon an enduring commitment to collective security and improved joint operations. Force improvement in concert with our allies is a central aim. We do not assume that we will operate alone, nor that our military forces can be effective except as a unified team responsive to our commanders-in-chief in the field.

- Third, it reflects a structured balance among force expansion, readiness, sustainability, and modernization. We have carefully planned to achieve a measured balance. We cannot assume undue risk in any one of these areas, all of which are essential.

- Fourth, it reflects current priorities among many competing demands. Under our revised planning process, development of the FY 85 program began over a year ago in the Fall of 1982, when priorities were evaluated in concert with policy and strategy. Subsequently, the Department's top management has cycled this budget through an intensive program review, as well as a budget review, to refine, reassess, and update priorities for both acquisition management and mission requirements.

B. ACQUISITION PRIORITIES

The President's defense program requires that modernization of our capabilities be balanced among nuclear and conventional needs; and among major military mission requirements. This approach retains the flexibility to act effectively now, and to prepare for an uncertain future.

A strong free enterprise economy and industrial base--here and abroad--are the essential underpinnings of our defense posture. Investment in our technology base and protection of our technological strength are critical to the long term security of the U.S. and our allies. It is also our considered belief that success, particularly in achieving the conventional forces posture we need, is highly dependent on modern technology, and its coordinated application. We cannot effectively field this technology without an increasingly efficient industrial base and improved joint planning.

Modernization, in the true sense of the word, means achieving the military capabilities essential to respond to the contemporary environment as well as to the environments of the future. It depends upon our technological strengths, but does not mean wholesale introduction of technological sophistication into our forces as an end unto itself. To the contrary, modernization relies upon judicious application of our technological strengths to critical areas where they have the greatest leverage, particularly to those areas where opportunities exist to exploit our strengths and the weaknesses of aggressors who might threaten us. It also means making better use of the systems already available to us.

We have historically emphasized the superior performance of our weaponry, and will continue to seek better weapons than our opponents because we do not expect to be able to match the quantity of weapons of our likely opponents. Our acquisition management reforms will enable us to do this at affordable costs, while also improving reliability, support, and interoperability. Most importantly, top management attention has been re-directed to total mission area operations and capability, as opposed to giving priority to individual weapon performance. We will continue to examine our needs from a mission area perspective which emphasizes the integration of land, air, and naval forces.

C. NUCLEAR FORCES FOUNDATION

The foundation of our strategy and program is built on the adequacy of our strategic nuclear forces to deter aggression or coercion The opportunities for modern conventional defense depend upon this foundation having been established.

This budget reflects sustained progress toward more effective capabilities of our nuclear and conventional forces.

The President's five-point Strategic Modernization Program is designed to meet the foregoing criteria. The program is now well established; affordable; and can meet cost and schedule milestones.

In addition, President Reagan announced his Strategic Defense Initiative in his speech to the nation on last March 23. He directed studies to achieve two objectives: (1) assessment of the roles that defense against ballistic missiles could play in future U.S. and allied security, and (2) definition of a long term research and technology development program aimed at an ultimate goal of eliminating the threat posed by nuclear-armed ballistic missiles. The recent technology study concluded that powerful new technologies are becoming available that justify a major technology development effort to provide future technical options to defend against nuclear ballistic missiles. The strategic analysis concluded that pursuit of advanced technologies could offer options to enhance deterrence and increase strategic stability. Our FY 1985 RDT&E budget request reflects these conclusions, both by a restructuring of the program to gather the various DoD efforts of the Strategic Defensive Initiative into a more centralized management, and by increasing the funding in this area by $250 million, an increase of 16% over the level of funding previously planned by DoD for efforts in this area.

Our non-strategic nuclear forces contribute to deterrence by supporting a strategy of flexible response through a balanced combination of conventional, non-strategic nuclear, and strategic nuclear forces. In NATO, non-strategic nuclear forces are intended to deter a Soviet/Warsaw Pact conventional attack or first use of non-strategic nuclear weapons, and to couple NATO forces to the U.S. strategic forces.

Modernization and arms reductions are integral elements of a coherent national security posture. Modernization will help persuade the Soviets that we are serious about deterring war by protecting peace and freedom, and that it is in the best interest of the Soviet Union, as well as the U.S., to achieve the substantial reductions we are seeking in our as well as Soviet nuclear arsenals.

Our overall approach to our nuclear forces program expresses our grave concern over the full range of Soviet nuclear forces from intercontinental missiles to battlefield nuclear missiles. The evolution of Soviet strength and the realities of the nuclear force balance demand a sound strategic force structure and timely modernization to prevent any further shift of the balance in their favor. At the same time, we must maintain our efforts to achieve nuclear arms control agreements with the Soviets in order to reduce the risk of nuclear war.

D. EMERGING TECHNOLOGIES FOR CONVENTIONAL FORCES

We must, in addition, take the necessary steps to improve our conventional defense capabilities in order to increase our strength at all levels of the deterrence spectrum. NATO forces, given limited warning, risk being overrun by an intense Soviet conventional attack. Conventional weapons incorporating recent technological advances, effectively employed throughout the Alliance, offer a potential for improving the overall defensive posture and delaying the need for early use of nuclear weapons. This is particularly the case with air/land combat, where we are numerically inferior to the Warsaw Pact. These technological advances offer not only the prospect for improving the capability of individual systems but also the combined capability of our forces. Advanced battle management systems can raise the effectiveness of our forces by enhancing cross-Service and alliance coordination. Improved conventional weapons systems can significantly contribute to deterrence and defense against combined attacks designed to overwhelm our forces. By exploiting a qualitative edge in weapon system capabilities, we can help offset our quantitative disadvantage and reduce the risk of war.

Emerging technologies have already provided numerous possibilities for improving conventional capabilities. Improved interface between sensors and weapons, enhanced intelligence integration, stronger electronic countermeasures, and greatly improved long-range target acquisition are among the many applications. These capabilities are made possible through advances in micro-electronics, machine intelligence, computer and software technology and micro-optic sensing technology.

In addition to improving combat capabilities, the new classes of weapons will enable us to improve our capabilities against the enemy's follow-on forces. At the same time, new technological breakthroughs enable us to develop more effective and coordinated counter-air architectures by making it possible to oppose the full spectrum of enemy air operations with minimum delays. Significant prospects for improving conventional deterrence, delaying the need for early use of nuclear weapons, and thereby, enhancing overall security dictate that we continue to seek promising applications of emerging technologies to the air/land warfare mission areas.

E. COOPERATION WITH OUR ALLIES

An array of programs are underway within the United States and other NATO countries which will make it possible to capitalize on the potential offered by emerging technologies. Intensive consultation and coordination among the allies is essential in order to establish national and alliance priorities, and to establish programs which offer opportunities for sharing and exchange. At the same time, both U.S. and allied military authorities are evaluating how to refine doctrine to make the best use of technological opportunities and of our combined resources. Our joint efforts also help to enhance unification and improve overall efficiency within the alliance.

The Secretary of Defense has introduced the conceptual framework for "Emerging Technologies" in NATO. Priority attention in the Alliance is now focused on four mission areas: (1) Defense against first echelon attack; (2) Attack of follow-on forces; (3) Counter-air; and (4) C^3I and Counter-C^3. Other areas will also receive appropriate consideration in the NATO framework, and at the same time, bilaterally with the concerned nations. These include the maritime mission area, and special requirements of the Northern and Southern regions of NATO.

The goal, which is shared by our NATO partners, is to make real, visible and expeditious progress in cooperative efforts to field effective systems that would otherwise not have been widely deployed, and to accelerate procurement of selected systems consistent with an overall long range acquisition strategy within the alliance. It is important that common concepts and doctrine serve as the basis for effective integration of allied conventional force improvements. It is particularly critical for the Congress to support this effort.

We will pursue similar efforts with Japan and other allies on the basis of defining forces/missions consistent with U.S. and allied objectives, and then working to rationalize these two sets of needs in a way that most efficiently uses the resources of all. We are coordinating efforts with the Japanese, for example in the areas of air and sea lane defense within our mutual broad-based mission needs.

Success in the application of available new technologies ultimately depends upon coordinated efforts to modernize military doctrine and procedures in concert with the introduction of capabilities. We are making progress both on a cross-Service basis through the leadership efforts of the JCS, and on a bilateral and multilateral international basis as well.

F. TECHNOLOGY TRANSFER CONTROL

One of the Soviets' major weaknesses of the past was their technology base and their inability to translate their research into high quality end items. To remedy this deficiency, as well as to enhance their military power, the Soviets have devoted vast amounts of their financial and personnel resources to the acquisition of Western technology. They consider the acquisition of Western technology as an effective tool in reducing the costs, risks and time involved in overcoming their scientific, technical and military shortcomings. Acquisition of the most needed and critical foreign technology is planned at a very high level to facilitate the decision making, planning, and allocation of resources.

The Soviets have been very successful in obtaining vast amounts of militarily significant Western technology and equipment through legal and illegal means. They apply diverse acquisition methods--often several approaches simultaneously. The Soviet intelligence services (KGB and GRU) have the primary responsibility for collecting Western classified, export-controlled and proprietary technology using both clandestine and overt collection methods. Western technology plays an extremely important role in the development of military capabilities by the Soviet Union. We need to prevent the continued Soviet improvement of already deployed weapons and their development of new weapons through the acquisition and exploitation of advanced Western technologies.

As we might expect, the Soviets also encounter difficulties in exploiting and adapting Western equipment in their reverse engineering efforts to achieve a production capability. Problems encountered include material purity, dimensional tolerances and production quality. Although the resulting performance level is often less than that of the Western item, it usually represents an important improvement over previous Soviet products.

G. SCIENCE AND TECHNOLOGY BASE

The free world's advanced technological capability is integral to maintaining a strong defense and, hence, deterrence. The U.S. enjoys a certain margin of technological superiority, but we can't take our lead for granted. The Soviet Union is making a determined and, in many cases, successful effort to reduce or overcome our technological lead.

Discoveries and technological breakthroughs that can have a force multiplier effect are made through investment in our science and technology base. While we seek to take advantage of the opportunities to enhance our immediate defense capabilities, we must, at the same time, continue to invest in our future.

Our earlier reliance on superior technology to field superior weapon systems to offset quantitative disadvantages has been jeopardized by recent Soviet technological advances. In several critical areas of ground combat, the efforts of Soviet R&D have led to the fielding of some weapon systems which are technologically equal to our own. As the Soviets continue to increase their R&D efforts and proliferate their new systems, we must match their progress with contributions from a vigorous R&D effort consisting of the defense industry, independent R&D programs, and allies who are technologically advanced.

During the 1965-75 period, the real dollar value of our technology base activity declined by about 50%. Real growth was resumed in 1976, but at a very low rate. This defense program requests a 5%-6% real increase per year in technology base activity. This accounts for slightly more than 1% of our total defense budget each year; yet, it is this category of program activity that is critical to our ability to efficiently meet the threat 10 to 15 years in the future.

H. INDUSTRIAL BASE

The requirement to meet future defense needs also demands that we attend to the industrial base. We do not maintain a large standing army on the Soviet scale, and are therefore reliant on our capacity to mobilize forces and manufacturing equipment needed to sustain them.

The Soviets have a military production policy which stresses large quantity buys over long periods of time, maintenance of defense production lines for wartime surge, and a national plan for conversion of specified civil plants to military production for additional wartime surge. They also ensure retention of plant floorspace and skilled manpower in defense R&D and production organizations through central control. They maintain full capacity utilization by early transition into new products or product specialties when programs are cancelled or completed.

Through various initiatives contained in the Acquisition Improvement Program (AIP) we are encouraging an increase in capital investment in the industrial base by the private sector. The Military Departments and Defense agencies are also advancing innovative acquisition strategies, which are reflected in this budget to hold down production lead times along with the associated costs. In those areas where production lead times are too long, we are taking steps to identify critical components and to stockpile them in adequate quantities. The capacity and readiness of our industrial base is critical to the credibility of our overall deterrent, and thus to the overall global stability we seek.

I. THE MANAGEMENT CHALLENGE

Success in translating this budget and the associated five year plan into a sound national security posture rests on consistent, sound and prudent management. This management cannot be accomplished by the Department of Defense alone, but must be a collective effort involving industry, the Department, other executive agencies, and the Congress. We must have a consistent, stable joint management approach in order to develop and acquire the weapons systems required to serve mission needs and maintain our national security.

A variety of initiatives resulting from the Defense Acquisition Improvement Program have been undertaken to accelerate the acquisition process in order to be more responsive to the threat and to increase acquisition efficiency through better management. We are particularly concerned with the problem of reducing costs while continuing to meet our basic security needs. Much of the cost growth we have experienced in the past has been due to instability in our programs. Repeated stops, starts, and stretchouts have generally occurred in order to satisfy near-term budgetary constraints. The result has been serious growth in long-term costs for some systems.

Since program instability is the result of a number of contributing factors, the solution to the problem must be comprehensive. It is vital at the outset to establish a consensus with Congress on our long range defense priorities, missions, and economic requirements. We are continuing to work to build this essential foundation through specific initiatives such as multi-year procurement and economic production rates. Both of these initiatives are designed to lend greater stability to our programs, and are strongly supported by industry. In addition, both can save billions of dollars in acquisition costs. In order to achieve the benefits of increased stability, however, the support of Congress for these initiatives is essential.

Unanticipated cost growth has also been caused by overly optimistic cost estimates for many of our programs. We are taking the necessary steps to minimize this problem in the future. Our objective is to provide a realistic budget for defense programs which contains only those programs we really need, and a realistic and full assessment of their cost. To the degree that our efforts are successful and are supported by Congress, greater stability will accrue to all of our programs with consequent reductions in overall cost.

We are also aware that unless the systems we acquire are ready to use and can be sustained for long periods, all other acquisition initiatives may become irrelevant. A variety of management initiatives are included in the Acquisition Improvement Program to ensure that problems of readiness and sustainability are considered from the very beginning of each of our programs, and are attended to at each major milestone in the acquisition process. Spare parts acquisition reform and many other specific acquisition management activities compliment these initiatives and are addressed further in Chapter III.

In addition, we have placed high priority on our R&D program for weapon support and logistics. It has three principal thrusts. At the centerpiece is our funded R&D program that demonstrates high payoff support technologies to accelerate their early transition into the field. Our management of this program has provided DoD-wide objectives and a framework for the Services to ensure a coordinated approach. Secondly, we have institutionalized within our evaluation of contractor independent research and development (IR&D) programs this vital area of focus, and communicated to industry our objectives of applying technology to substantially reduce the logistics support for current and future weapon systems. Third, we have expanded the R&D framework to include initiatives aimed at increasing the productivity of the support system itself, such as depots, transportation, supply, etc. These elements of our R&D

program combine with our Acquisition Improvement Program to increase the importance of logistics at the front end of weapon system development, formalize it within the DSARC and budget processes, and strengthen the technology base. It is essential, however, that funding for our initiatives in readiness, support and R&D for weapon sustainability and logistics be provided in order to reap the benefits of our management initiatives in this area.

Finally, we are placing special management emphasis on improving competition throughout the acquisition process in order to achieve greater savings and enhance the defense industrial base. We have already established organizational mechanisms in each of the major buying commands to promote competition wherever it makes economic sense to do so. Competition goals have been set and incentives are being provided to assist in attaining them.

J. SOVIET MODERNIZATION

The persistent Soviet force modernization program remains our greatest concern. Figure I-1 compares overall defense expenditures of the U.S. and NATO with the estimated dollar cost of defense for the Soviet Union and its Warsaw Pact allies. The U.S. seeks, in cooperation with its allies, to maintain a military balance at an affordable cost. Figure I-2 shows the fraction of GNP estimated to be dedicated to defense in the U.S. and the Soviet Union. Until recently, in the Soviet Union, the share of the resources allocated to the military has allowed for some growth in private consumption. However, as growth in the Soviet economy slows, the Soviets have been faced with some difficult resource allocation decisions. Scattered evidence suggests that economic problems have played a role in retarding the growth of resources devoted to defense procurement. However, Soviet RDT&E spending has continued its unabated growth. Uncertainty about the extent clouds our assessment of the future effect of economic problems on defense. In the past, however, Soviet economic problems have not led to a substantial reduction in the growth in the military portion of their national resource allocation.

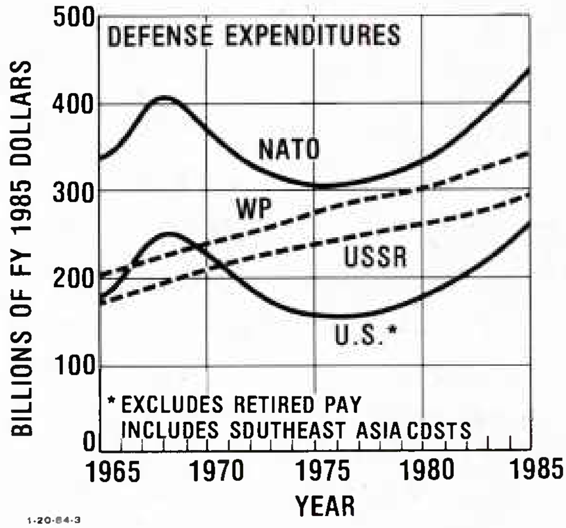


FIGURE I-1. A Comparison of NATO Defense Expenditures with Estimated Dollar Cost of Warsaw Pact Defense Activities

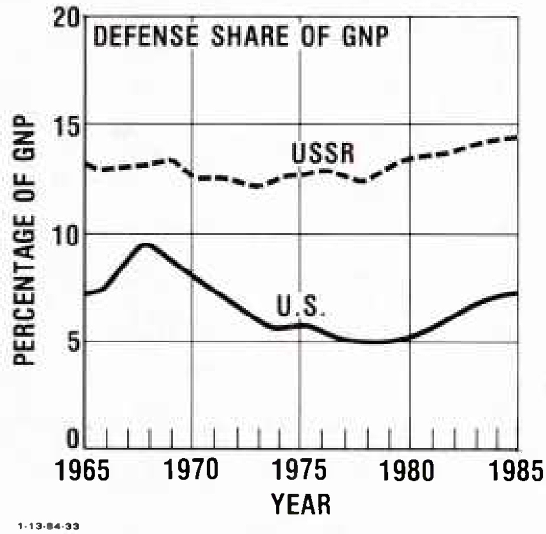


FIGURE I-2. A Comparison of the Defense Fraction of U.S. GNP with Estimated Defense Fraction of USSR GNP

A comparison of production ratios of major classes of weapons in Figures I-3 and I-4 shows a Warsaw Pact military advantage of more than two-to-one in most classes. The "FOR" bar on the charts indicates that production earmarked for a country's/alliance's own forces; whereas the "BY" bar is indicative of total production. Except for major surface combatants, the USSR has substantially outproduced the U.S. in the period of 1974-1983, not only in terms of the total weapons produced BY the USSR for all countries, but in terms of the weapons produced FOR USSR forces. The situation is improved when NATO acquisition is compared with that of the Warsaw Pact. Even though procurement expenditures by the Soviets and their allies have shown reduced growth in recent years, they are expected to continue to introduce new weapons at a high rate.

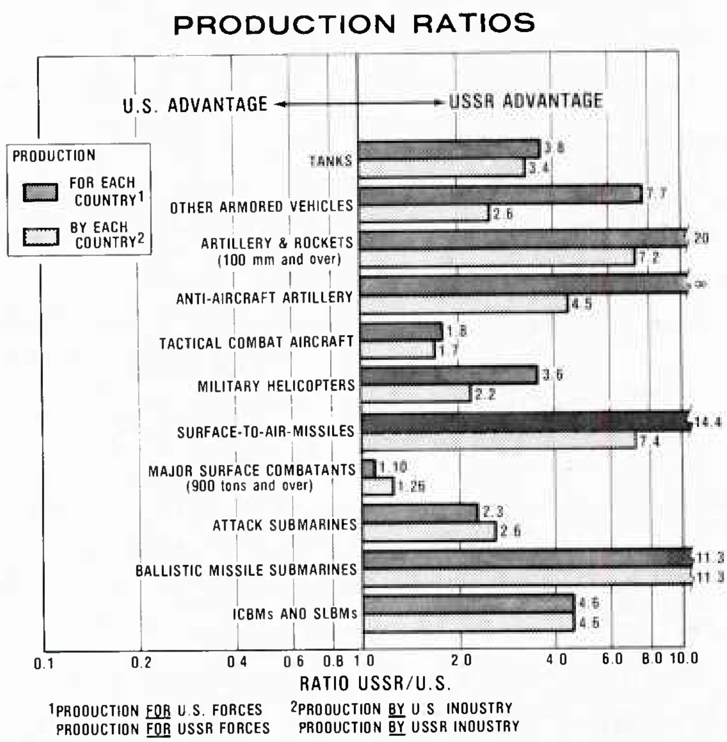


FIGURE I-3. Production Ratios of Selected Weapons USSR to U.S., 1974-1983

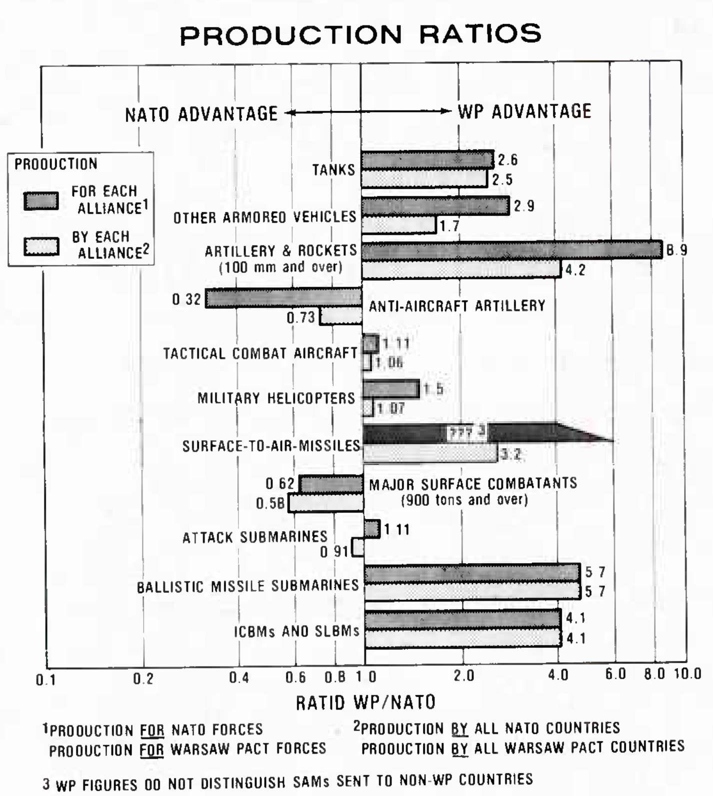


FIGURE I-4. Production Ratios of Selected Weapons WP to NATO, 1974-1983

Further assessment of the military RD&A balance in Chapter II, which follows, includes additional quantitative indicators which you can consider in forming your own conclusions about Soviet modernization and its impact on the military balance. The Soviet modernization program is a formidable challenge to peace, to U.S. security, and, in the most practical terms, a challenge to our collective abilities to find ways to deal with it.

K. THE CHALLENGE FOR THE FUTURE

Insights into the Soviet acquisition and decision-making process combined with a knowledge of activities underway in their defense industry provides considerable knowledge of the existence and status of many new weapon programs. We can now predict most Soviet force developments they intend to field by the end of the decade. Table I-1 provides a list of about 50 of roughly 200 Soviet programs expected to reach Initial Operational Capability in the eighties. When these programs are added to about 80 systems already deployed since 1980, a broad and very diverse Soviet military acquisition program for the decade of the 1980s is evident.

A comparison of major U.S. and Soviet force improvement trends for the late 1980s shows many common goals. Six major areas receiving significant emphasis are: 1) improving strategic forces survivability and lethality; 2) improving the ability to conduct military operations in distant areas; 3) improving command and control assets survivability; 4) improving strategic defense, 5) expansion of space programs, and 6) improved effectiveness of tactical forces.

Soviet top leadership promises the deployment of new weapons, space and military support systems. This threat will come to pass not as a result of what the U.S. or the Free World might or might not do in the near term, but primarily as a result of earlier Soviet views of their requirements and

TABLE I-1
Some Major Soviet Development Programs Reaching IOC in the Mid-1980s

o STRATEGIC OFFENSIVE SYSTEMS

SS-X-24 (MX Class) Solid Propellant Intercontinental Ballistic Missile (ICBM)
Improved Liquid Propellant ICBMs
SS-X-25 Small Solid Propellant ICBM
SS-N-20 (D-5 Class) Sub Launched Ballistic Missile (SLBM)
Typhoon (Ohio Class) Nuclear Powered Ballistic Missile Submarine (SSBN)
Blackjack (B-1B Type) Heavy Bomber
Air Launched Cruise Missile (ALCM)
BEAR H, Probable ALCM Carrier
SS-NX-21 (Tomahawk Class) Sea Launched Cruise Missile
SS-NX-23 Sea Launched Ballistic Missile
Y-Class Nuclear Cruise Missile Submarine (SSGN) Mod

o STRATEGIC DEFENSIVE SYSTEMS

SA-10 Surface-to-Air Missile--Mobile Modification
Modified GALOSH Anti Ballistic Missile Interceptor
High Acceleration Anti Ballistic Missile Interceptor
Pushkino Very Large Anti Ballistic Missile Radar
SU-27 (FLANKER) Interceptor Aircraft
MAINSTAY Airborne Warning & Control System (AWACS)
Abalakovo Very Large Radar

o SUPPORT SYSTEMS

CONDOR Heavy Lift Transport (C-5A Type)
CANDID Tanker (C-141 Type)

o TACTICAL SYSTEMS

SS-X-23 Short Range Ballistic Missile
Short Range Ballistic Missile (SRBM) Modifications
SA-X-12 Surface-to-Air Missile
New Attack Helicopter
Electro-Optical Tactical Air-to-Surface Missile
Large Caliber Unguided Rocket
Laser-Guided Bomb
Cluster Bomb
New Mobile Self-Propelled Anti-Aircraft Artillery (Sgt York Type)
Millimeter Wave Anti-Tank Guided Missile
SS-N-19 Long Range Anti-Ship Missile
OSCAR Class Nuclear Powered Cruise Missile Submarine
SS-N-22 Short Range Anti-Ship Missile
Ground Launched Cruise Missile
New Naval Surface-to-Air Missile
Big New Nuclear Powered Submarine
New Medium Size Nuclear Attack Submarine
SLAVA Class Cruiser
MIG-29 (FULCRUM) Interceptor Aircraft
AA-X-10 Air-to-Air Missile

o SPACE SYSTEMS

Medium Lift Space Booster
SATURN Class Heavy Lift Booster
Space Plane
Space Shuttle
Large Space Station
Potok Communications Satellite (4 GHz)
Antisatellite System

subsequent planned investment for military forces. Major systems recently deployed or now late in development were generally initiated at the highest levels of Soviet leadership about ten years ago.

The Soviets view a powerful military as essential to ensure their national security. Based on what we know of their current programs we see no let-up in the rate of deployment of Soviet systems over the next ten years. Soviet ideology leads the Soviets to believe eventual victory is their long term destiny and this belief allows them to justify the hardship and sacrifices they are making to sustain the military buildup. The negotiation of an equitable, verifiable arms control agreement remains our first priority. The challenge we face is whether we have the will to sustain the competition against a steadily growing threat.

II. BALANCE OF MILITARY EQUIPMENT ACQUISITION AND TECHNOLOGY

A. INTRODUCTION

To set the stage for our program of military research, development and acquisition, in this chapter we compare some important measures of the trends of the USSR/U.S. and the Warsaw Pact/NATO alliances' programs to develop and produce military weapons.

Soviet military power is of paramount importance to the Soviet state. They have maintained and equipped large military forces throughout most of their history. The Soviets have always felt threatened from without and have sought to extend and maintain influence and control beyond their borders. They believe that they need numerical superiority to ensure national security. The Soviets do not seek security through balance of power relationships but rather by being stronger than any combination of potential adversaries.

Soviet defense production is expected to continue to receive high priority. The slackening in output of the last few years has lessened as the problems associated with phasing out older weapons systems and bringing in newer systems, developing and manufacturing higher technology weaponry and industrial base modernizational have been overcome. However, serious basic problems exist in the Soviet economy and unless improvements are made the Soviet leadership will be faced with difficult decisions in order to sustain increased levels of military spending.

We use four kinds of indicators to illustrate various aspects of the military equipment acquisition (RDT&E and procurement) balance--the number of new weapons or major modifications introduced, the number of weapons produced, the average age of weapons in the forces, and estimates of annual resources, measured in terms of dollar costs. The comparison of military investment is particularly useful as a significant leading indicator of the future military balance. In addition, we display some estimates of the total inventory value which is simply the total procurement cost of all the weapons in the force.

We recognize that these indicators do not fully describe the military balance. They obviously do not tell us about the interaction of the forces in war, or how the enemy or our allies will actually perform in combat, or what the outcome of battle will be. Despite their limitations, these static measures provide an important and useful comparison of potential capabilities, and provide useful insights and a historical perspective of major trends.

We shall see the evidence of the persistent, increasing Soviet threat as we compare (1) the weapons R&D and procurement process and the defense industrial base, (2) weapons acquisition and investment trends, and (3) the military technology base.

B. WEAPONS R&D AND PROCUREMENT PROCESS

1. Soviet Military Research and Development

The Soviet Union believes world leadership in science and technology is a major element in overall world leadership--industrially, economically, militarily, and politically. The Soviets have established a centrally controlled system to carry out their R&D programs, and to implement the flow of research through the various phases--fundamental, exploratory and applied.

The Politburo sets the broad national R&D policies and occasionally even initiates new weapon programs (e.g., atomic bomb and ballistic missile developments). Soviet R&D strategy for the achievement of these goals includes a high and steadily increasing level of resource investment and essentially involves two approaches: (1) the establishment and expansion of a large indigenous technology base to support military and industrial development programs; and (2) the acquisition and assimilation of Western technologies to reduce the time, cost and risk involved in supporting their industrial and military programs. The Soviet military RDT&E program is characterized by a stability of funding, personnel, program plans and steady growth.

The primary performers of Soviet R&D are research institutes, design bureaus, and production associations. These activities are vertically organized, which has led to activities conducted by highly specialized independent entities often isolated from each other.

The research institutes (military and civilian) conduct most Soviet research projects and many are under the jurisdiction of the Academy of Sciences. The overall number of research institutes in the USSR has doubled from 1,500 in 1960 to over 3,000 in the early 1980s. This reflects a steady expansion of the Soviet research base and a significant level of capital investment.

Over the past several years, the Academy and other Soviet civilian research institutes have been tasked with an increasing number of defense projects. Military R&D has risen to where it now accounts for about half of all R&D conducted in the USSR. This compares to the roughly thirty percent of all U.S. R&D which is currently military-related work.

Design bureaus are assigned to the defense industrial ministries and are critically important for technical innovation and development in the Soviet Union. Organizationally located between the research community and the separate production organizations, the design bureaus are responsible for developing new equipment embodying the best available technology consistent with system requirements. Features of this management approach include multi-year program funding, planned product improvement and early responsiveness to U.S. and NATO program developments. Only a small amount of basic research is performed by design bureaus.

Major new Soviet systems or modernization programs take about 8-15 years to develop. This is about the same time it now takes in the U.S. The Soviets have maintained this development time despite often shifting the focus and specialities of their system designers in response to new requirements.

Military service developed requirements keep the design bureaus fully occupied. New programs are routinely initiated that keep design bureaus fully employed.

Roughly 50 major system design bureaus are involved in the development of Soviet major weapons, space and support systems. Table II-1 compares the number of Soviet design bureaus in selected categories with the number of major U.S. system development organizations conducting similar programs. While the number of U.S. and Soviet weapons and space development organizations are about the same, differences in how the Soviets task their organizations has resulted in greater output over time. Each Soviet organization has its own specialization(s) and continuously conducts development at the full employment level-of-effort the Soviets feel is needed to handle their long term military/space requirements. U.S. contractors have more cyclical business and employment fluctuates accordingly, substantially dropping if they do not win new prime contracts.

TABLE II-1. Number of U.S. and USSR Major Military System Developers*

SYSTEM TYPE	U.S. MAJOR SYSTEM DEVELOPMENT ORGANIZATIONS	USSR DESIGN BUREAUS
STRATEGIC & TACTICAL MISSILES	12	11
AIRCRAFT	12	9
SHIPS	1	6
SATELLITES	8	6
TRACKED VEHICLES AND ARTILLERY	8	7
RADARS	7	8
TOTAL	48	47

* Some involved in more than one system type

Full employment and steady growth has allowed the Soviets to conduct up to three major development programs in each major design bureau product base at the same time. More than 200 major military development programs are initiated by the 50 major Soviet design bureaus every 10 years.

Soviet R&D practices can be summarized as follows:

- Great emphasis on fulfillment of development milestones and schedules.

- Reduction of development risk through:

  - Incremental improvements
  - Use of proven technologies

- Strict standardization and specification constraints imposed.

- Emphasis on producibility/dependability/simplicity/durability/reliability/serviceability.

Organizations called production associations are replacing many independent research institutes, design bureaus and other production organizations as the basic units of Soviet industry. Associations vertically combine a number of organizations under a single management; they can include some or all of the above types of independent organizations. The principal purpose of the shift to the association form of management is to accelerate the pace of science and technology progress and to reduce the lead times in the implementation of new technology into production. Eventually most of Soviet industry will be converted to the association form of management.

The Soviets have a military production policy which stresses large quantity buys over long periods of time, maintenance of defense production lines for wartime surge, and a national plan for conversion of specified civil plants to military production for additional wartime capability. They also ensure retention of plant floorspace and skilled manpower in defense R&D and production organizations through central control. They maintain full capacity utilization by early transition into new products or product specialties when programs are cancelled or completed.

2. Soviet Defense Industry Weaknesses

Despite its size, experience, stability and priority, the Soviet military R&D system has a number of inherent weaknesses. These, in general, are a result of the overall Soviet political, economic and organizational philosophy. Several specific key factors have had a significant impact on the efficiency and effectiveness of Soviet R&D. One such factor, already mentioned, stems from their vertical concentration of R&D activities in large, highly specialized, independent entities. This leads to organizational isolation of R&D organizations from each other and from production organizations. The centrally managed system cannot quickly assimilate or coordinate changing directives and requirements coming from several associated external sources.

The Soviets also are unable to make use of the inherent advantages of competition found in free enterprise economies. Some reforms are underway (such as the production associations) but much of the traditional system has been left intact. Equipment and instrumentation shortages plague most Soviet R&D efforts and R&D organizations are often compelled to design and manufacture their own instruments. Computer services are in especially short supply. The USSR also tends to follow the U.S. in technology because Soviet rewards are for maintaining schedule rather than technical innovations that win contracts.

Although the Soviet Union annually graduates around three times the number of engineers graduated in the U.S. (a high percentage of U.S. graduate students are foreign born), there is widespread underemployment. Soviet engineering manpower is used inefficiently and is frequently over-specialized.

To remedy the difficulties in translating their research into efficiently produced, high quality end items the Soviets have established a vast program for the acquisition of Western technology. Even here, the Soviets encounter difficulties in exploiting and adapting Western equipment in their reverse engineering efforts to achieve an efficient mass production capability.

3. R&D Output

The Soviet Union considers the amount of resources devoted to military R&D to be a state secret. The output of the military R&D effort can be seen in the new and improved weapons that result, but the size of the input investment to develop them is concealed.

Figure II-1 compares the number of major new weapons and major modifications introduced each year and displays trends over the period 1960 to 1983. Figure II-1 shows the Soviets maintaining the number of new systems and major modifications being deployed at 10-15 per year since 1960.

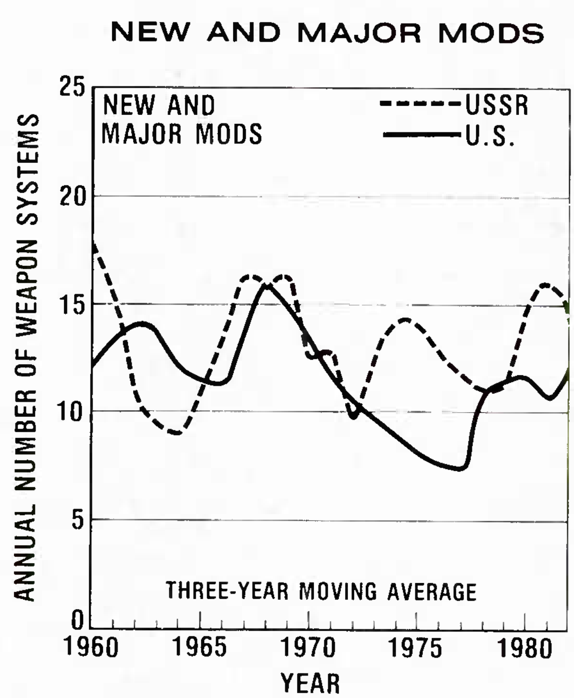


FIGURE II-1. Number of U.S. and USSR New Weapons and Major Modifications Reaching Initial Operational Capability Annually

In addition, many modification programs of lesser significance are conducted. While the U.S. deployed the same average number of systems as the Soviets in the 1960s, the average dropped sharply in the early 1970s. In the past two years, however, the number of new U.S. systems reaching initial operational capability has increased.

The number of known Soviet systems deployed thus far in the 1980s is twice that of the U.S. New Soviet systems recently deployed are the result of program development decisions made by their leadership in the early and mid 1970s. The approximately 80 systems the Soviets have deployed thus far in the eighties include a large number of incrementally improved systems and reflects the Soviet step-by-step approach in incorporating new technology.

C. WEAPONS ACQUISITION AND INVESTMENT TRENDS

This section provides indicators of U.S. and USSR military acquisition and investment in totals and for the major strategic and general purpose forces missions.

Soviet authorities provide little direct information about their research, development, procurement or their investment activities. Estimates of Soviet military investments can be developed by using a number of different methods. The following estimates are based on what it would cost to develop and build in the U.S. the Soviet weapons and systems assigned to each military mission category. Prevailing U.S. dollar prices for materials and labor (including overhead and profit) are used, as well as U.S. production technology. While they do not represent the cost to the USSR, they are indicative of trends or major changes in the size of the Soviet effort over time. Also, investment usually implies an input to a process but we estimate investment based on the observed output of the weapon acquisition process--the products of R&D and procurement.

1. <u>Overall Military Investment</u>

Resources committed to RDT&E, procurement, and military construction are investments which maintain or increase the value of a nation's military assets for the future. A major determinant of military capability in any given year depends in part on the inventory of equipment, facilities and weapons built up over time. The total value of that inventory depends, in part, on the rate at which new investments are made.

Figure II-2 shows a steady increasing Soviet military investment compared to the ups and downs of U.S. military investment. In the last 10 years the estimated dollar cost of Soviet military investment has exceeded that of the U.S. by roughly $450 billion as a result of persistent real growth over a 20 year period.

Figure II-3 shows that we are starting to overcome the Soviet procurement lead. However, in the past ten years, we estimate that the dollar cost of Soviet procurement would have been $200 billion more than the cost of U.S. procurement.

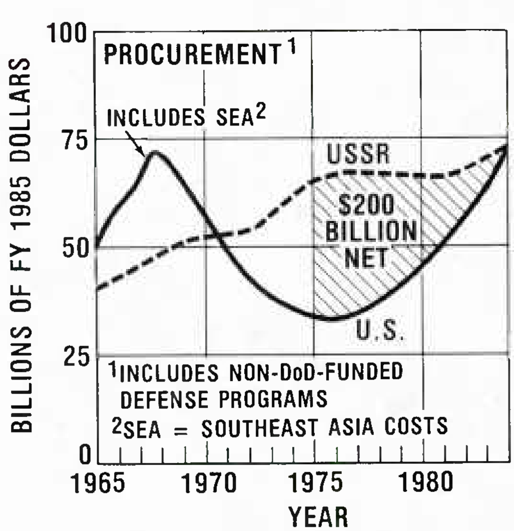
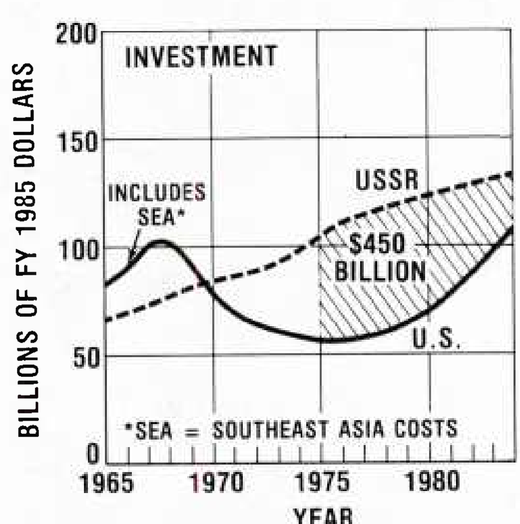


FIGURE II-2. A Comparison of U.S. Defense Investment Expenditures with Estimated Dollar Cost of USSR Defense Investment



NOTE:
(1) INCLUDES RDT&E, PROCUREMENT AND MILITARY CONSTRUCTION.
(2) INCLUDES NON-DoD-FUNDED DEFENSE PROGRAMS.

FIGURE II-3. A Comparison of U.S. Defense Procurement Expenditures with Estimated Dollar Cost of USSR Defense Procurement

The persistent growth of Soviet military RDT&E spending (Figure II-4) has resulted in current estimated dollar costs for RDT&E activities roughly double those of the U.S. Comparisons of R&D activities are based on estimates that are considered to be the least reliable of Soviet defense expenditure estimates since they develop from less explicitly related and aggregated measures.

Soviet RDT&E has been increasing in real terms at an average of about seven percent per year for 20 years (doubling in real terms every ten years) and is growing more than other Soviet military investments. In the past ten years the dollar cost of Soviet R&D activities have been an estimated $185 billion more than the U.S. While there is significant uncertainty in these estimates, this long term trend cannot be allowed to continue.

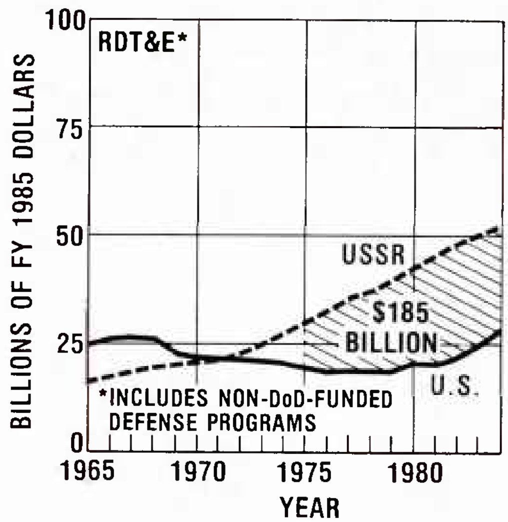


FIGURE II-4. A Comparison of U.S. Defense RDT&E Expenditures with Estimated Dollar Cost of USSR RDT&E

2. <u>Strategic Forces</u>

In the early 1970s the strategic forces of the two superpowers were considered to be in rough parity. Figure II-5 shows that over the past ten year period, the estimated

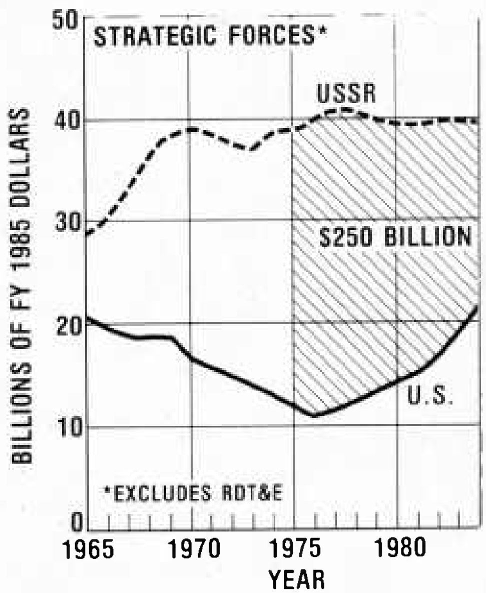


FIGURE II-5. A Comparison of U.S. Strategic Force Expenditures with Estimated Dollar Cost of USSR Strategic Forces

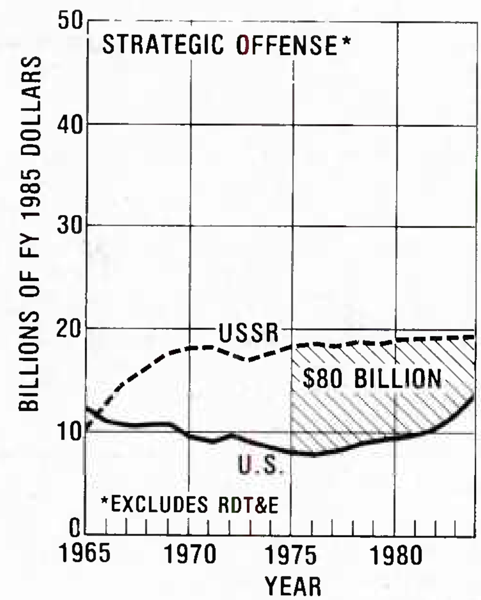


FIGURE II-6. A Comparison of U.S. Strategic Offense Expenditures with Estimated Dollar Cost of USSR Strategic Offense

total cumulative dollar costs of Soviet strategic forces exceeded that of the U.S. by about $250 billion (in constant FY 1985 dollars), a difference that is almost double the total U.S. outlays for strategic forces for the same period. With this disparity the earlier parity of forces was unlikely to continue.

a. Strategic Intercontinental Offense

These forces comprise intercontinental bombers and associated tankers and air-to-surface missiles, land based intercontinental ballistic missiles (ICBM), submarine launched ballistic missiles (SLBM) and the associated submarines (SSB/SSBN). Figure II-6 compares the estimated costs for these forces and shows that for the past ten years the USSR estimated dollar cost of strategic offense forces was twice corresponding U.S. expenditures.

Figure II-7 depicts the weapons and systems in this category that became operational or are expected to be operational between 1960 and 1990. The contrast from 1972 to 1979 in the era of detente after SALT I is particularly striking. Note that the high level decision to proceed with

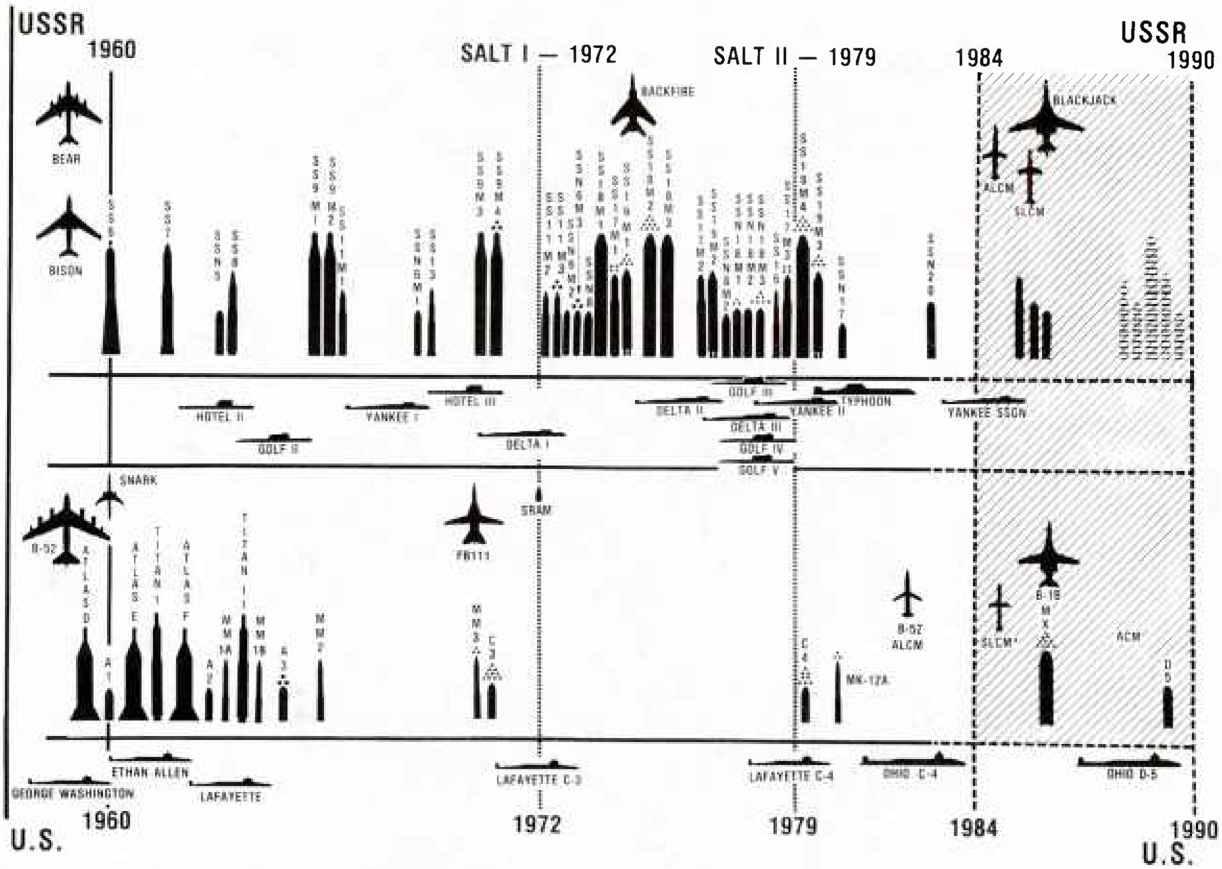


FIGURE II-7. U.S. and USSR Strategic Offensive Systems Since 1960 (Depicted by Date of System IOC)

full development of these systems is typically made ten years before the year of initial operational capability (IOC).

The Soviet strategic offense buildup in the decade of the '70's is seen in the magnitude of the estimated dollar cost of Soviet strategic offense procurement activities shown in Figure II-8. The dollar cost of USSR strategic offense procurement is estimated to have been approximately $50 billion more than that of the U.S. for the last ten years.

Soviet strategic forces are considerably newer than comparable U.S. forces. The comparative trend of average age for ICBMs is shown in Figure II-9.

The estimated total inventory "value" (defined as the average unit procurement cost multiplied by the quantity in the force) of all the weapons in the operational forces is shown in Figures II-10 and II-11.

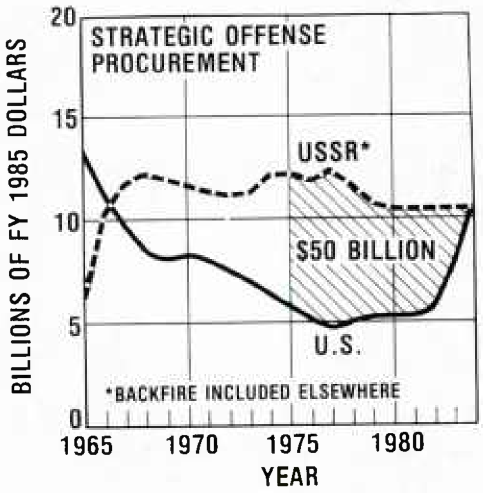


FIGURE II-8. A Comparison of U.S. Strategic Offense Procurement Expenditures with Estimated Dollar Cost of USSR Procurement

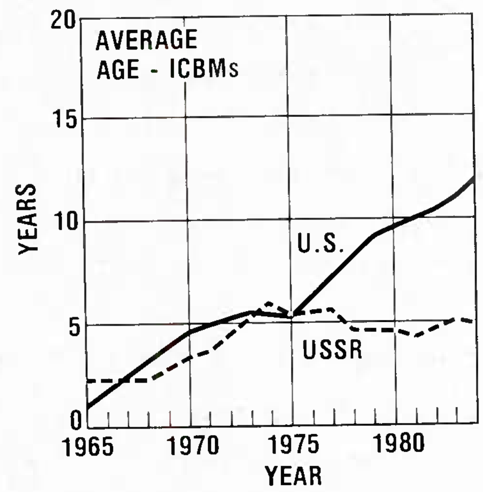


FIGURE II-9. A Comparison of Average Age of U.S. and USSR ICBMs

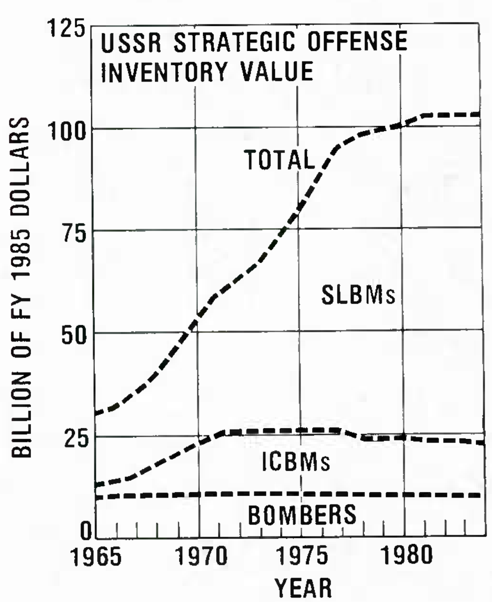


FIGURE II-10. USSR Strategic Offense Force Inventory Value

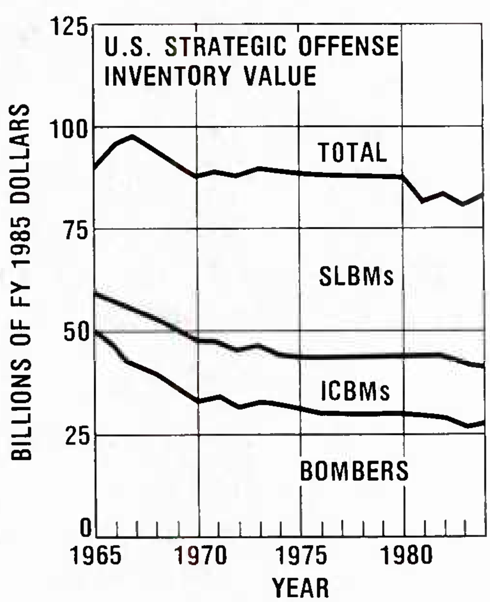


FIGURE II-11. U.S. Strategic Offense Force Inventory Value

The estimated inventory value of USSR strategic offensive weapons has exceeded that of the U.S. since the mid-70's and is now about one-fourth greater. Further, the pattern of the values retained in the strategic offense forces is markedly different for the U.S. and the USSR. The greater investment and the longer retention in active forces result in the current estimated "value" of Soviet SLBM forces alone being approximately equal to total current inventory value of all U.S. strategic offense forces.

Major Soviet improvements to their strategic offensive forces include deployment of new solid propellant land-based systems. The Soviet Navy is presently replacing shorter range SLBM systems exposed to Western ASW in their open ocean patrol areas, with long-range systems that can be deployed close to the Soviet Union. The Soviets are also developing a new heavy bomber, the Blackjack. The new bomber is expected to be equipped with a new air-launched cruise missile (ALCM) which will provide the capability to attack targets from long range.

For our part we are planning to modernize our ICBM forces with PEACEKEEPER missiles; our sea-based forces with new TRIDENT submarines armed with C-4 missiles and eventually the improved D-5 SLBM; our bomber forces with the new B-1B bomber scheduled to become operational in 1986, the Air Launched Cruise Missile, and a new advanced cruise missile. Research for an Advanced Technology Bomber (ATB) and small ICBM is currently underway.

b. <u>Strategic Defense</u>

The principal purpose of strategic defense is to enhance the survivability, and hence the effectiveness of strategic deterrence--the National Command System network, strategic retaliatory forces and our military force and base infrastructure. In the 70's the U.S. essentially eliminated strategic defense procurement and forces. A comparison of the estimated dollar cost of U.S. and Soviet strategic defense procurement is shown in Figure II-12.

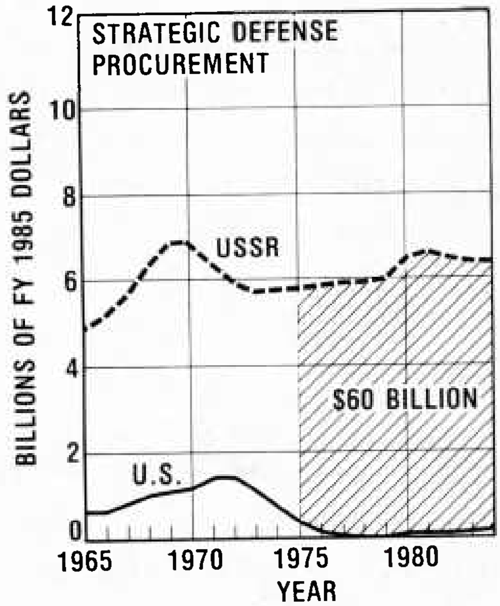


FIGURE II-12. A Comparison of U.S. Strategic Defense Procurement Expenditures with Estimated Dollar Cost of USSR Procurement

About one-third of Soviet procurement for strategic forces has been for procurement of strategic defense systems (including ballistic missile and air defense but excluding civil defense). The Soviets have installed and maintained a large strategic defense force to defend against a large and diversified threat from many nations. It includes the world's most extensive air defense of the homeland consisting of thousands of radars and interceptor aircraft, and a limited ballistic missile defense of Moscow. It is estimated that over the past decade the dollar cost of Soviet strategic defense activities have been more than the cost of U.S. strategic offense activities. Soviet strategic air defense costs have been many times more than U.S. expenditures on bomber forces which, presumably, is one of the major drivers of Soviet expenditures on strategic defense.

The Soviet's strategic air and missile defense activities undergo constant modification and improvement. New generation Soviet SAMs, a look-down shoot-down fighter (Foxhound) and an Airborne Warning and Control System (AWACS) platform are coming into service, along with new or modified Anti-Aircraft Missiles. In ballistic missile defense they are now upgrading the interceptors around Moscow. Also nearing completion are five very large radar sites located throughout the Soviet Union for early warning and possibly ABM battle management.

The U.S. is currently introducing F-15 interceptors into its national air defense and is providing AWACS support for these forces. The U.S., in conjunction with Canada, is in the process of upgrading the air surveillance network around North America. Specifically, the development of new unattended radars along the Dew Line and Over the Horizon Backscatter (OTH-B) radars are intended to provide the National Command Authorities (NCA) sufficient tactical warning to increase survivability of strategic retaliatory forces.

Both the U.S. and the Soviet Union maintain a high level of research activities designed to exploit the technological opportunities for strategic defense that emerge from the expanding technology base. Both countries recognize that the rapid expansion of the technology base could offer opportunities for significant increases in defensive capability. Our recently completed studies responding to the President's initiative to eliminate the threat posed by ballistic missiles graphically describe these long range opportunities in ballistic missile defense.

3. Non-Strategic Nuclear Forces

Non-strategic nuclear forces (NSNF) are an essential link between conventional and strategic nuclear forces and provide a wide range of options to deter conventional, chemical or nuclear attack. This category includes intermediate-range ballistic missiles, ground-launched cruise missiles, dual-capable aircraft, short and medium range missiles, and nuclear capable artillery.

The U.S. is modernizing, augmenting and adding versatility to our NSNF. We are deploying the Pershing II theater ballistic missile, and ground launched (GLCM) and submarine launched (SLCM) cruise missiles. We are also improving the capabilities, survivability and safety of our combined worldwide NSNF and its supporting command, control, communication and intelligence systems.

At the same time, NATO has decided that it can meet the requirements of deterrence and defense with fewer nuclear weapons in Europe than had previously been deployed. Thus, the NATO Defense Ministers agreed in October 1983 that we would remove 1400 nuclear weapons from Europe over the next several years. Those withdrawals will be in addition to the 1000 warheads removed in 1980, and in addition to those that will be removed on a one-for-one basis for every PERSHING II or GLCM warhead that is deployed.

There is an extensive strategic cruise missile development program underway in the USSR. In addition to the previously mentioned Air Launched Cruise Missile (ALCM), the Soviets are developing sea launched and ground launched cruise missiles as well as a large number of new and modified platforms for them. To support this large effort there is a significant expansion taking place at Soviet production plants expected to produce these cruise missiles.

The Soviets continue to deploy the SS-20 ballistic missile system as well as a new generation of new and modified shorter range systems--the SS-21, 22 and 23.

Figure II-13 shows comparative trends in the total number of non-strategic nuclear warheads in NATO and the Warsaw Pact. The Soviets have been steadily increasing the number of Warsaw Pact nuclear warheads, while NATO has been slowly decreasing. After 20 years of these trends, the Warsaw Pact has roughly twice as many nuclear warheads as NATO.

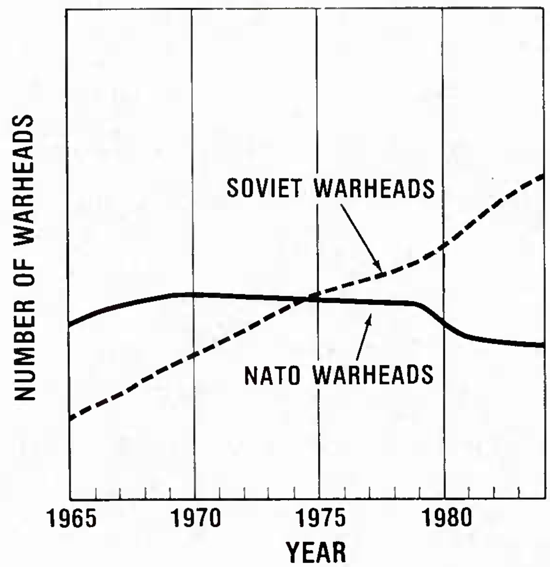


FIGURE II-13. Trends in the NATO/ Warsaw Pact Total Number of Non-Strategic Land Attack and Defensive Nuclear Warheads

4. <u>General Purpose Forces</u>

Ground forces, tactical air forces, naval forces and mobility forces (including airlift and sealift forces) make up general purpose or conventional forces. The Soviets have continued their steadily growing program of modernization and expansion for their general purpose forces. Figure II-14 compares the total outlays for the U.S. and USSR general purpose forces. Figure II-15 shows that over the decade 1974-1983, the estimated dollar cost of the Soviet general purpose force procurement exceeded that of the United States by approximately $100 billion. As shown, we are making a substantial effort to redress the serious imbalance in equipment procurement illustrated by this spending imbalance.

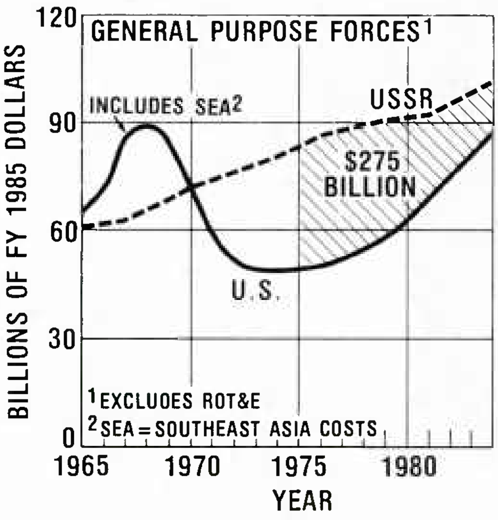


FIGURE II-14. A Comparison of U.S. General Purpose Force Expenditures with Estimated Dollar Cost of USSR Forces

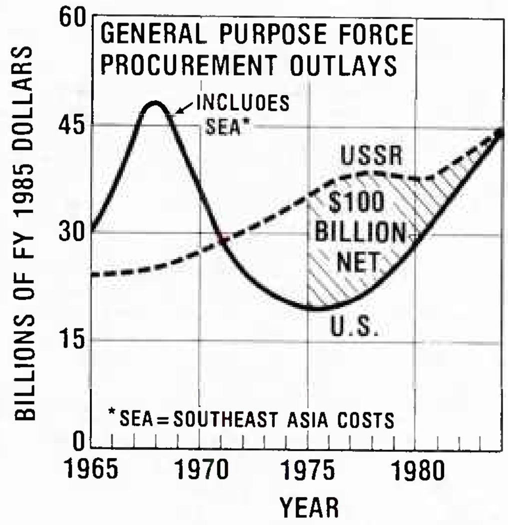


FIGURE II-15. A Comparison of U.S. General Purpose Force Procurement Expenditures with Estimated Dollar Cost of USSR Procurement

a. <u>Land Forces</u>

After strategic rocket forces, Soviet land forces are most important to the Soviet Union. As a result, the ground forces are being constantly strengthened and modernized to improve their capability to fight either a conventional or a nuclear war. The Soviet ground forces are better equipped to conduct chemical operations than any others in the world and they have the largest manpower component of the Soviet armed forces.

Figure II-16 compares procurement outlays of U.S. general purpose land forces with estimated dollar cost estimates of Soviet procurement. Note the persistent long term growth in Soviet costs compared to the very large changes in U.S. spending. Table II-2 shows production of land force weapon systems, and indicates any major ten year trends in procurement quantities.

TABLE II-2. Production Summary of Selected Land Forces Systems for NATO and WP Countries

CATEGORY	1974-1983 ANNUAL AVERAGE				1983				10-YR TREND	
	USSR	U.S.	WP	NATO	USSR	U.S.	WP	NATO	USSR	U.S.
TANKS	2,370	625	2,785	1,045	2,100	900	2,550	1,450		↑
OTHER ARMORED VEHICLES	4,550	605	5,540	1,750	4,100	790	4,800	2,540		
INF./COMBAT FIGHTING VEH.	2,810	90	3,120	290	3,100	600	3,650	800		↑
ARTY, MORTARS & ROCKET LCHRS. (100 mm and over)	2,600	160	2,950	360	3,800	370	4,400	600	↑	↑
ANTI-AIRCRAFT ARTILLERY	135	0	320	1,000	50	0	275	250	↓	
SAMs* (not man-portable)	24,100	960	24,100	3,000	28,000	100	28,000	5,700		↓

*USSR and WP figures include SAMs for other countries.

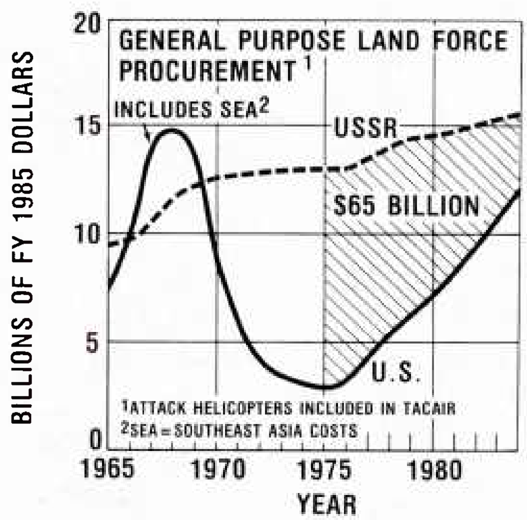


FIGURE II-16. A Comparison of U.S. General Purpose Land Force Procurement Expenditures with Estimated Dollar Cost of USSR Procurement

The tank is a prime element of Soviet Army strength with nearly 30,000 having been produced for the Warsaw Pact in the last decade. The Soviets have expanded their production capacity at plants producing tanks and self-propelled artillery. The Soviet Union's newest tank, the T-80, is now being fielded. At the same time the Soviets are modifying some tanks already in the inventory. Their expanded production base will allow them to continue to produce tanks and artillery at a greater level than any other nation.

Since 1970 the Soviets have produced an impressive series of armored combat vehicles--an average of one new system every two years--and nine new artillery weapon systems ranging in caliber from 85 mm to a 240 mm self propelled mortar.

During the same period the U.S. developed and produced the M60A3 and M-1 tanks, the M-2 family of fighting vehicles, the M-198, 155mm howitzer, the Multiple Launch Rocket System, and the Sergeant York Air Defense Gun System. Major modifications were also made to the self-propelled 155mm Howitzer and self propelled 8 inch howitzer.

In the last ten years the dollar costs of Soviet procurement have been roughly three times the U.S. investment in ground force weapons.

b. Tactical Aviation

Soviet forces included are frontal aviation and naval aviation. U.S. forces are the tactical aviation of our Air Force, Navy and Marine Corps and the attack helicopters of our Army. Strategic defense interceptors are not included in this mission.

The Soviets have made major improvements in their tactical air forces over the last fifteen years. A new generation of fighter/attack aircraft was introduced in the early 1970s (FLOGGER, FITTER C/D, and FENCER) that enabled the Soviet tactical air forces to assume new offensive missions extending well into NATO territory. These aircraft displaced short-range FISHBED and FITTER A aircraft and now make up much of the Soviet tactical aircraft inventory. New, improved variants of these aircraft have appeared over the years, such as the FLOGGER G air-to-air fighter and FLOGGER D/J ground attack aircraft. Another generation of entirely new aircraft is about to enter service. Two are fighters, the MiG-29/FULCRUM and the SU-27/FLANKER. FULCRUM is expected to enter operational service this year, with FLANKER following later. Both appear to have much improved maneuverability over earlier Soviet aircraft and both have "look-down" radar for detecting targets at low altitudes. A new close air support aircraft, the SU-25/FROGFOOT, has undergone considerable operational evaluation in Afghanistan and may be planned for wider deployment to units in the Soviet Union. The FROGFOOT's mission is similar to that of the U.S. A-10.

The USSR has produced approximately two new series of helicopters every five years. The Mi-26/HALO A heavy lift helicopter became operational in 1982. It is about twice the size of the largest U.S. helicopter and more than doubles the Soviet Mi-6/HOOK lifting capacity. The Soviets are developing a new attack helicopter which is expected to achieve operational capability in the near future.

Figure II-17 shows the trend of estimated procurement costs for all tactical combat aircraft for the period 1965 to 1985. Figure II-18 shows the total value of these forces as measured by the sum of the initial procurement cost. The surge in Soviet procurement beginning in 1970 is caused primarily by the modernization, described above, of the fixed wing attack force, the introduction of attack helicopters and, to a lesser degree, modernization of the fighter force. It is estimated that the dollar cost (value) of Soviet procurement in tactical aviation is now approximately double that of the U.S., and has been for over ten years. Production of tactical aircraft is indicated in Table II-3. Note in particular the Soviet emphasis on the attack helicopter, and the large disparity between U.S. and Soviet attack helicopter production rates.

c. <u>Naval Forces</u>

Included in General Purpose Naval Forces are major surface combatants (over 900 tons), attack submarines, ASW aircraft and ASW carriers, amphibious warfare ships and naval forces directly supporting the fleets (auxiliaries).

TABLE II-3. Production Summary of Selected Tactical Aircraft for NATO and WP Countries

CATGEGORY	1974-1983 ANNUAL AVERAGE				1983				10-YR TREND	
	USSR	U.S.	WP	NATO	USSR	U.S.	WP	NATO	USSR	U.S.
FIXED-WING										
STRATEGIC DEFENSE INTERCEPTORS	220	0	220	30	100	0	100	75	↓	
TACTICAL COMBAT AIRCRAFT	620	350	780	700	450	380	600	680	↓	
TANKERS	0	0	0	0	1	0	1	0		
ROTARY-WING										
MILITARY HELICOPTERS	570	160	750	500	480	150	630	470		
ATTACK HELICOPTERS	190	45	190	160	250	10	250	100		↓

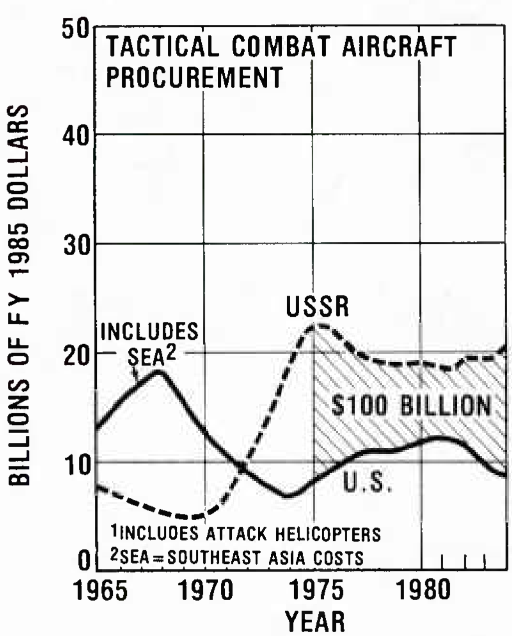


FIGURE II-17. A Comparison of U.S. Tactical Combat Aircraft Procurement Expenditures with Estimated Dollar Cost of USSR Procurement

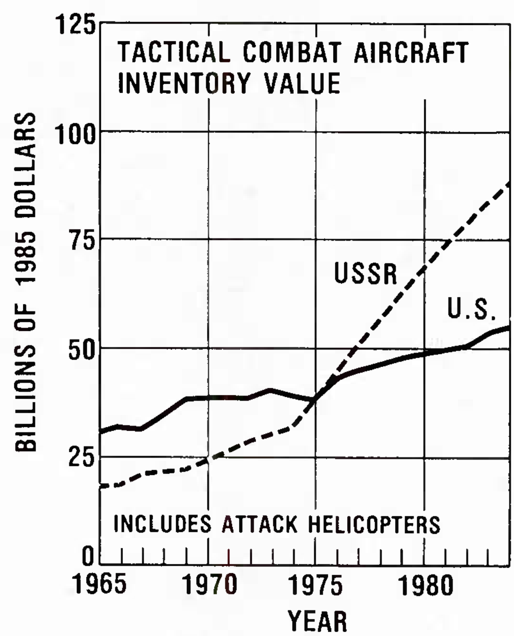


FIGURE II-18. Estimated Tactical Combat Aircraft Inventory Value of the U.S. and USSR

The USSR has about 30 percent more surface combatants in its fleet than the U.S. However, overall displacement tonnage of the U.S., including aircraft carriers, is nearly 20 percent greater than that of the USSR.

The Soviet naval investment strategy differs substantially from that of the U.S. Half the estimated dollar value of the Soviet inventory is in attack submarines, whereas half the value of the U.S. inventory is distributed roughly equally between attack submarines and aircraft carriers.

Included in major surface combatants are attack and ASW carriers, battleships, cruisers, destroyers, and frigates (over 900 tons). A comparison of major surface combatant procurement costs is shown in Figure II-19. Figure II-20 shows the estimated inventory value of U.S. and USSR major surface combatants.

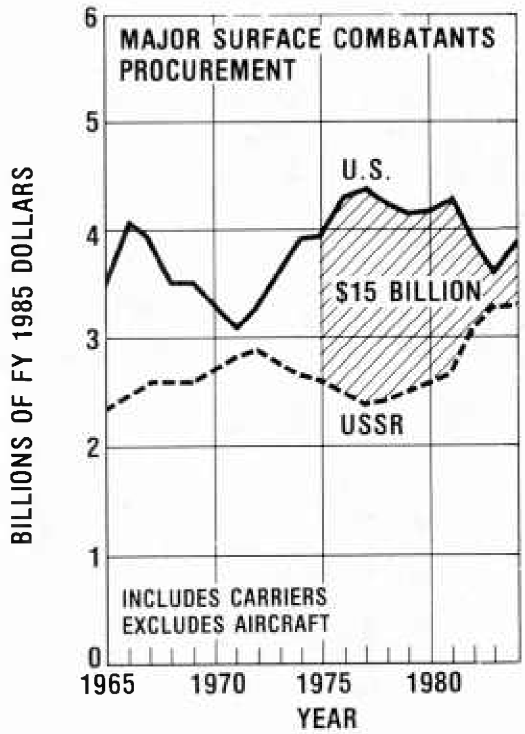


FIGURE II-19. A Comparison of U.S. Major Surface Combatant Procurement Expenditures with Estimated Dollar Cost of USSR Procurement

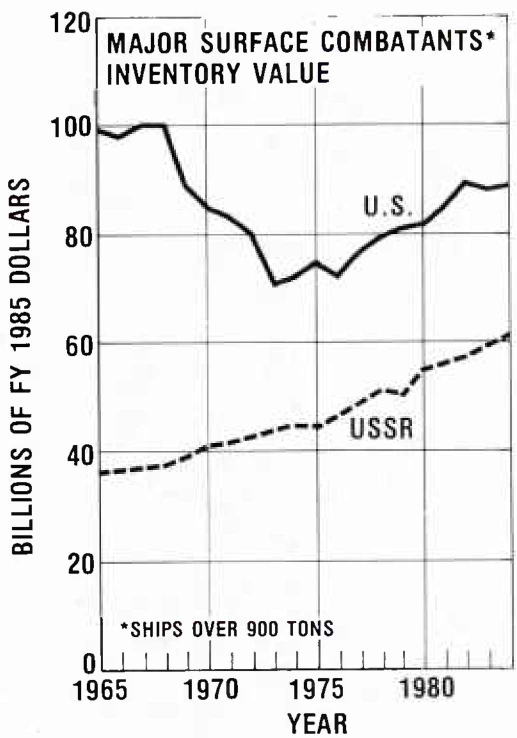


FIGURE II-20. Estimated Major Surface Combatant Inventory Value of the U.S. and USSR

Table II-4 shows naval production. Figures II-21 and II-22 show major surface combatant force size and age distribution of U.S. and USSR.

TABLE II-4. Production Summary of Naval Vessels for NATO and WP Countries

CATEGORY	1974-1983 USSR	1974-1983 U.S.	1974-1983 WP	1974-1983 NATO	1983 USSR	1983 U.S.	1983 WP	1983 NATO	10-YR TREND USSR	10-YR TREND U.S.
	10 YEAR TOTAL									
MAJOR SURFACE COMBATANTS (900 tons and over)	91	83	107	172	9	12	12	21		↑
MAJOR AMPHIBIOUS SHIPS	22	5	33	9	2	0	2	2		
BALLISTIC MISSILE SUBMARINES	34	3	34	6	1	1	1	1	↓	
ATTACK SUBMARINES	69	30	69	62	7	4	7	7		
	ANNUAL AVERAGE									
NAVAL MISSILES										
SAMs*	2,000	550	2,000	1,250	3,200	1,100	3,200	1,750	↑	↑
SSM	200	150	200	150	300	240	300	240	↑	↑
ASM	240	100	240	100	200	50	200	50		↓

*USSR and WP figures include SAMs for other countries.

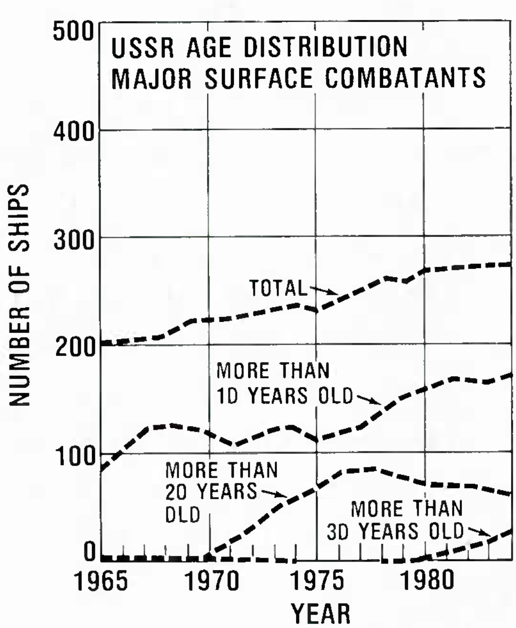


FIGURE II-21. Age Distribution USSR Major Surface Combatants

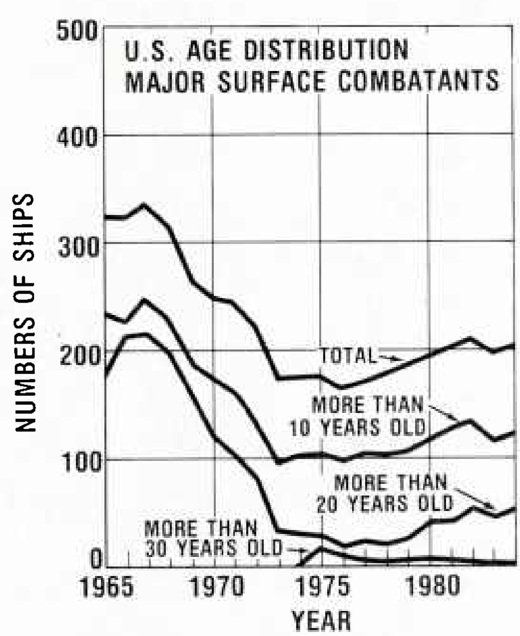


FIGURE II-22. Age Distribution U.S. Major Surface Combatants

Soviet construction of general purpose naval ships increasingly emphasizes large, sophisticated ships capable of sustained deployments in distant areas. These ships--such as the KIROV class nuclear-powered guided missile cruisers and the OSCAR class nuclear-powered cruise missile submarines--pose an increasing threat to our naval surface forces, even though the Soviets have currently built only a small number of these new type ships. Current Soviet major surface combatant construction programs include KIROV class nuclear-powered cruisers, SLAVA class conventionally-powered cruisers, the SOVREMENNYY and UDALOY class destroyers, and GRISHA class light frigates. The second unit of the KIROV class--the largest cruiser type ships in the world--will be operational this year. The lead ship of the SLAVA class made its initial out of area deployment in late 1982. This ship displaces 12,500 tons and mounts a formidable battery of 16 large SS-N-12 antiship cruise missiles. Few additional units of the size of the KIROV or SLAVA are expected, priority being given to destroyer and frigate types. The U.S. now produces three classes of surface warships, one class each of attack and ballistic missile submarines and one type of aircraft carrier.

Until approximately 1977, dollar costs of Soviet Union and the United States nuclear attack submarine (SSNs) were estimated to be similar. Since then the dollar costs for Soviet SSNs are estimated to be significantly higher than U.S. outlays. Construction continues on the VICTOR-III class nuclear-powered attack submarines, though this class may be approaching the end of its production run. Two of the huge new OSCAR class nuclear powered cruise missile submarines (SSGN) are afloat, the first launched in 1980 is now operational. These ships displace 12-14,000 tons submerged and carry 24 of the long-range SS-N-19 antiship cruise missiles. Two entirely new nuclear-powered attack submarines were launched in 1983. One, designated the MIKE class, is larger than the CHARLIE/VICTOR classes but smaller than the giant

OSCAR class. The second unit, designated SIERRA class, is more nearly comparable to the CHARLIE/VICTOR classes in size, and may be intended for a large production run during the 1980s. During the 1980s, Soviet procurement of SSNs is expected to average about double that exhibited in the 1970s. Further, the Soviet dollar costs of diesel submarines are estimated to be an additional $0.7 billion/year. The new KILO class diesel-powered attack submarine, introduced in 1981, is now in series production.

As noted last year, the Soviets have begun construction of a mid-size, nuclear-powered aircraft carrier intended to operate conventional takeoff and landing (CTOL) tactical aircraft. The ship is projected to be completed by 1990. Precise information on the capabilities of this ship and its air group is not yet available, but we anticipate that it will roughly equate to our MIDWAY class in size, and will carry modern fighter aircraft incorporating the latest Soviet technology. One such ship, or even a few, will not checkmate our carrier aviation strength. It probably will take the Soviets years to develop satisfactory flight deck procedures and become capable of high-intensity flight operations. Nevertheless, such naval air forces would be a major advance in Soviet ability to project military power in distant areas and could be a significant factor in regional conflicts not involving the U.S.

5. Mobility Forces

The mobility mission includes airlift and sealift, and military port operations. No Soviet military sealift force is known to exist as a separate entity from their commercial ships. The U.S. with its many overseas bases and a need to supply them by sea and by air has a greater requirement for mobility forces than the USSR. A comparison of U.S. mobility procurement outlays (shown in Figure II-23) with estimated dollar costs of Soviet activities shows that USSR costs over the most recent decade were nearly triple those of the U.S.

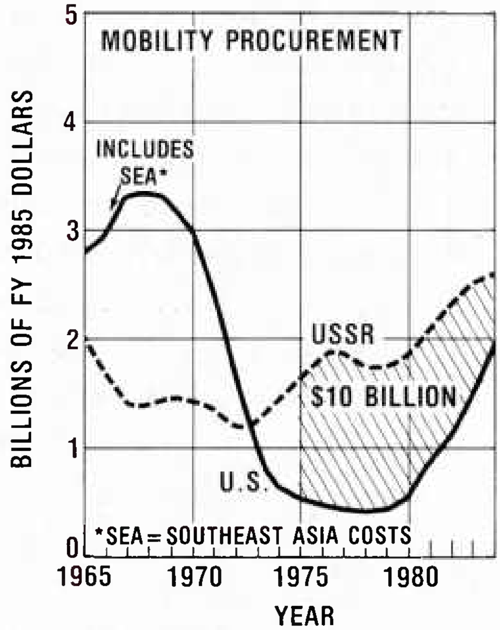


FIGURE II-23. A Comparison of U.S. Mobility Force Procurement Expenditures with Estimated Dollar Cost of Soviet Procurement

The Soviets have substantially increased the production capability for strategic airlift and transports. The expanded Soviet aircraft industry will enable them to build moderate numbers of their new heavy air cargo carriers which are similar to our C-5. Additionally, continued production of IL-76 (similar to C-141) and IL-86 transports will provide Soviet transport aviation a greatly increased military airlift capability by the late 1980s.

We are planning to improve the U.S. airlift capability by procuring additional C-5 transports. Research and development has begun on a new heavy lift transport, the C-17, that when deployed will provide our fleet with increased flexibility. An additional 44 KC-10 tanker/cargo aircraft are also being procured to support our airlift fleet. Sealift is being increased by the addition of 21 roll-on/roll-off supply ships, and increasing the ready reserve force to 77 ships.

6. Space

The Soviets attach great importance to their space program. In the past five years the USSR has launched approximately 500 spacecraft. Figure II-24 compares the number of U.S. and USSR annual launches. The total weight of the Soviet payloads put in orbit annually (660,000 pounds) is ten times that of the U.S. On any given day, the number of active satellites (110-120) in orbit from each country is about the same. More than half of Soviet satellites serve military purposes. Some 85 percent of all Soviet space launches are exclusively military or joint military/civilian missions. With the development and employment of an anti-satellite weapon, the Soviet Union clearly signaled its recognition of space as a potential hostile arena.

Figure II-25 compares estimated total military and civilian space program dollar costs for the U.S. and USSR.

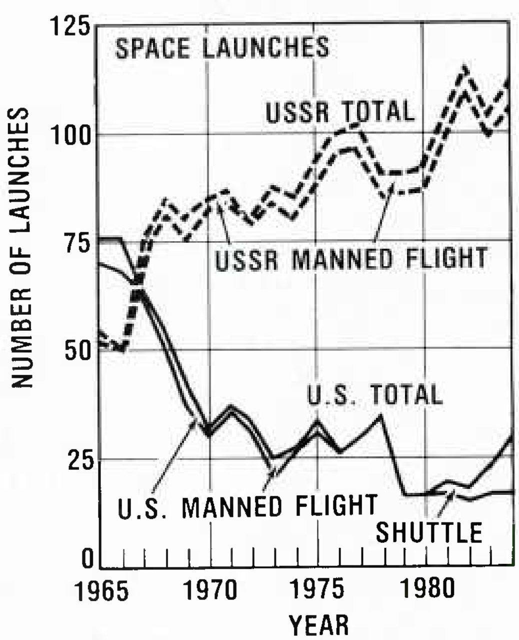


FIGURE II-24. Annual Number of U.S. and USSR Space Program Launches

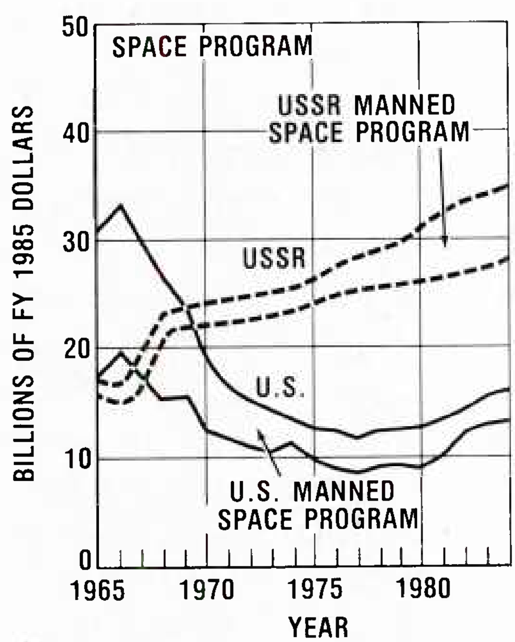


FIGURE II-25. A Comparison of U.S. Space Program Expenditures with Estimated Dollar Cost of USSR Space Program

The Soviets are expected to significantly increase the resources for new space facilities and systems. We expect the overall cost of the Soviet space program to roughly double in the eighties. Approximately twenty percent of the dollar costs for Soviet activities will be for an expanded manned effort. Major investments are now being made for production of large, new boosters, new large space stations, and a reusable space transportation system. We also expect an enlarged lunar and planetary program, as well as improved space based military capabilities.

D. MILITARY TECHNOLOGY BASE

Earlier in this chapter it was shown that dollar estimates of Soviet programs for military RDT&E have been steadily increasing and are currently nearly double those of the United States. Comparison of Tables II-5 and II-6 vividly indicate that we need to improve our exploitation of basic technology in translating it into deployed military capabilities.

Table II-5 compares the 20 basic technologies that have the greatest potential for significantly improving military capabilities in the next 10 to 20 years. This table indicates that the United States has maintained its lead in most of the basic technologies critical to defense, although the Soviets are eroding the lead in many of the basic technologies where the U.S. now leads. It is essential that we maintain our technological lead in order to somewhat offset the great disparity in quantity of deployed equipment.

Table II-6 compares the technology level reflected in deployed weapon systems. It should be noted that these assessments are technology level only, and do not measure overall force or weapon effectiveness which is highly dependent on other factors such as doctrine, tactics, training and numbers deployed. For example, although the U.S. and USSR are assessed as being technologically equal in most land force systems, the greater number deployed by the Soviets results in their having an overall superiority. The table shows, in aggregate, roughly the same level of deployed technology in strategic and land forces, with the U.S. superior in our naval and C^3I deployed technology level. However, the number of arrows tending toward Soviet equality or superiority is a matter of concern.

Even though the U.S. maintains its preeminence in most basic technology areas, its technology lead in deployed systems is steadily being eroded because the Soviets have become capable of routinely deploying new and improved weapons at high production rates with IOCs closely following U.S. comparable systems IOCs. Consequently, the number of years the U.S. could maintain a technical advantage upon deployment of a new U.S. system has been markedly reduced.

TABLE II-5. Relative U.S./USSR Standing in the Twenty Most Important Basic Technologies Areas*

BASIC TECHNOLOGIES	U.S. SUPERIOR	U.S./USSR EQUAL	USSR SUPERIOR
1. AERODYNAMICS/FLUID DYNAMICS		X	
2. COMPUTERS AND SOFTWARE	←X		
3. CONVENTIONAL WARHEAD (Including all Chemical Explosives)		X	
4. DIRECTED ENERGY (Laser)		X	
5. ELECTRO-OPTICAL SENSOR (Including Infrared)	X→		
6. GUIDANCE AND NAVIGATION	X→		
7. LIFE SCIENCES (Human Factors/ Genetic Engineering)	X		
8. MATERIALS (Lightweight, High Strength, High Temperature)	X→		
9. MICRO-ELECTRONIC MATERIALS AND INTEGRATED CIRCUIT MANUFACTURING	X→		
10. NUCLEAR WARHEAD		X	
11. OPTICS	X→		
12. POWER SOURCES (Mobile) (Includes Energy Storage)		X	
13. PRODUCTION/MANUFACTURING (Includes Automated Control)	X		
14. PROPULSION (Aerospace and Ground Vehicles)	X→		
15. RADAR SENSOR	X→		
16. ROBOTICS AND MACHINE INTELLIGENCE	X		
17. SIGNAL PROCESSING	X		
18. SIGNATURE REDUCTION (Stealth)	X		
19. SUBMARINE DETECTION	X		
20. TELECOMMUNICATIONS (Includes Fiber Optics)	X		

*1. The list is limited to 20 technologies, which in aggregate were selected with the objective of providing a valid base for comparing overall U.S. and USSR basic technology. The list is in alphabetical order. These technologies are "on the shelf" and available for application. (The technologies are not intended to compare technology level in currently *deployed* military systems.)
2. The technologies selected have the potential for significantly *changing* the military capability in the next 10 to 20 years. The technologies are not static; they are improving or have the potential for significant improvements; new technologies may appear on future lists.
3. The arrows denote that the relative technology level is changing significantly in the direction indicated.
4. The judgments represent consensus within each basic technology area.

TABLE II-6. Relative U.S./USSR Technology Level in Deployed Military Systems *

DEPLOYED SYSTEM	U.S. SUPERIOR	U.S./USSR EQUAL	USSR SUPERIOR
STRATEGIC			
ICBM		X →	
SSBN	X		
SLBM	X →		
BOMBER	X		
SAMs			X
BALLISTIC MISSILE DEFENSE			X
ANTI-SATELLITE			X
CRUISE MISSILE	X		
TACTICAL			
LAND FORCES			
SAMs (Including Naval)		X	
TANKS		X	
ARTILLERY		X	
INFANTRY COMBAT VEHICLES		X	
ANTI-TANK GUIDED MISSILES		X	
ATTACK HELICOPTERS (VTOL)		X	
CHEMICAL WARFARE			X
BALLISTIC MISSILES		X	
AIR FORCES			
FIGHTER-ATTACK AIRCRAFT	X →		
AIR-TO-AIR MISSILES	X		
PGM	X →		
AIR LIFT	X		
NAVAL FORCES			
SSNs	X →		
ANTI-SUBMARINE WARFARE	X →		
SEA BASED AIR	X		
SURFACE COMBATANTS	X →		
NAVAL CRUISE MISSILE		X →	
MINE WARFARE		X	
AMPHIBIOUS WARFARE	X →		
COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE			
COMMUNICATIONS	X →		
ELECTRONIC COUNTERMEASURES/ECCM	X		
EARLY WARNING (Includes Surveillance & Reconnaissance)	X		
TRAINING SIMULATORS	X		

*1. These are comparisons of system technology level only, and are not necessarily a measure of effectiveness. The comparisons are not dependent on scenario, tactics, quantity, training or other operational factors. Systems farther than 1 year from IOC are not considered.

2. The arrows denote that the relative technology level is changing significantly in the direction indicated.

3. Relative comparisons of technology levels shown depict gross standing only; countries may be superior, equal or inferior in subcategories of a given technology in a deployed military system.

III. ACQUISITION MANAGEMENT

A. INTRODUCTION

Three years ago we established the Acquisition Improvement Program (AIP) in order to solve some of the perennial problems which have confronted the Department of Defense in the acquisition process. Our primary concern then, as now, was to provide needed modern, reliable systems to our operational forces in a more timely fashion at an affordable cost. As a result of a determined effort at all levels, we have achieved considerable success in implementing the original 32 initiatives, and are continuing to make important progress each year.

During the past year new energy and direction for the AIP has been provided through the leadership of the Deputy Secretary of Defense. As a result of his review of the Program, the AIP initiatives have been consolidated into separate groups for focused management action. Of the original 32 initiatives, 13 have been fully implemented and will require only periodic monitoring to insure that they remain on track. A second set of nine initiatives show varying degrees of progress, but will require further implementing action by the Department. The remaining 10 initiatives have been consolidated into six major areas of emphasis under the cognizance of the Deputy Secretary. These six priority areas include the management initiatives which have posed the greatest challenge to acquisition reform, but which also promise the greatest potential benefits. They include:

- Program Stability
- Multiyear Procurement
- Economic Production Rates
- Realistic Budgeting
- Improved Readiness and Support
- Encouraging Competition

Our commitment to the implementation of the Acquisition Improvement Program (AIP) remains strong. High-level working groups for each of the six priority initiatives have been established, and have created action plans to improve our performance in these vital areas. Periodic implementation reports to the Deputy Secretary from the six Working Groups and the Joint Logistics Commanders are required in order to continue to assess our progress and to help define future tasks.

The results of our recent second year review of the AIP indicate that we have made substantial progress since the program was begun in April, 1981. I would like to share some of our more important achievements to date and to highlight some other important areas of progress in acquisition management.

1. <u>Increasing Program Stability</u>

In order to achieve the basic cost and efficiency objectives of the AIP, the chronic instability which has characterized defense programs in the past must be overcome. The difficulty lies in the fact that a multitude of variables affect program stability, many of which are beyond the direct control of the Department. Changes in the threat, advances in technology, development risk, and alterations in the total DoD budget all can contribute to design, cost, and schedule changes. The Department's efforts to improve stability in defense programs must be balanced against the need to retain the flexibility required to meet changing circumstances. In the final analysis lasting progress in improving stability, and thereby reaping its rewards, particularly reduced program costs, cannot be achieved without the understanding and support of Congress.

A primary cause of program instability which the AIP initiatives are intended to solve is the problem of affordability. Cost increases combined with increasing budgetary constraints result in inefficient procurement practices such as program stretchouts and delays which are often compounded when interim remedies are imposed. The solution to this problem rests with several important initiatives contained in the AIP. The management principles involved are simple: start only high priority programs which are fully funded by the Services; cancel lower priority programs; and, insure that program cost estimates are realistic and are fully supported each year. Important progress has been made in each of these areas during FY 1984.

- o The Defense Resources Board conducted a special review of all proposed New Start Programs during this year's budget review. Only 4 new starts were approved this year, a reduction from 10 programs in FY 1984 and 15 in FY 1983.

- o During the past two years, 118 lower priority programs have been cancelled or reduced which would have required about $7.7 billion during FY 1981-88. Included among these are a number of major systems such as the E-4B aircraft and the Roland air defense missile. Sixty-nine additional lower priority programs were terminated during the FY 1985 budget review. These programs represent estimated additional savings of $9.5 billion.

- o Planning and programming guidance continues to emphasize the need for funding stability for major programs. The Stable Programs List, which consists of congressionally approved multi-year programs, is a register of programs designated by the Services and approved by OSD for protection from perturbations in the budget, and includes 7 new programs added during FY 1984. A total of 24 programs are contained in the current Stable Programs List. It is particularly important that Congress support this concept to reduce costs.

2. Multiyear Procurement

Greater program stability with resultant cost savings can also be achieved when a clear commitment to a program is made early in the procurement phase of the acquisition process. A multiyear contract constitutes such a commitment and offers many advantages, including providing economies of scale, lot buying, a reduced administrative burden, and greater production efficiencies. Since the expanded use of multiyear was approved by Congress in FY 1982, we have proposed 36 multiyear programs. From the 21 of these 36 programs that Congress has approved, we estimate savings in excess of $3 billion compared to the cost of annual contracting.

Congressional support for multiyear has been essential to the success achieved thus far, but has weakened during the past year. The restrictions on multiyear contained in the FY 1983 and FY 1984 Defense Appropriations Acts, for example, have increased the reporting requirements and delayed the start of multiyear programs and have discouraged its use by program planners. In addition, of the 16 candidates submitted with the FY 1984 Defense budget request, Congress disapproved nine programs. Consequently, we lost potential savings of over $1 billion.

Despite these actions, our commitment to multiyear remains strong. Efforts are underway to convince Congress to repeal the FY 1984 Appropriations Act limitation on multiyear, and to identify additional multiyear candidates for future consideration. We are convinced the projected savings are real and will be achieved if we work together to pursue this major initiative.

3. Economic Production Rates

The thrust of the economic production rate (EPR) initiative is centered around two objectives: (a) promoting the use of EPRs in DoD, and (b) easing the transition from development to production.

Promoting more efficient production rates has had modest success in the past two years. We estimate that the eighteen programs approved for more economic production rates in the FY 1983 and FY 1984 budgets will save about $2.6 billion during FY 1982-89. Additional progress will be made with the FY 1985 budget, such as increasing the level of F-16 procurement.

This acquisition improvement initiative has been augmented by adding increased emphasis on Producibility Engineering and Planning (PEP). PEP promotes the attainment of a producible design as a product of engineering development and is instrumental in accelerating to and maintaining economic production rates for individual programs.

A new DoD Directive on the transition from development to production will emphasize the use of engineering disciplines in prioritizing an integrated technical approach to acquisition management. A formal method of identifying and progressively reducing production risk is being instituted beginning early in the acquisition cycle.

4. Realistic Budgeting

Since unanticipated cost growth from a variety of sources has contributed heavily to the instability and affordability problems, the AIP includes a comprehensive set of initiatives to solve this problem. One subset of initiatives is designed to provide more realistic costs of weapons systems than we have had in the past. We are also including in our budget estimates the estimated cost of technological changes and risk during development. Finally, our continued emphasis on competition serves as an important means to keep down costs.

The use of more accurate inflation indices in preparing the FY 1985 budget request has been a major step in the direction of cost realism. Research by the Department of Commerce indicates that inflation experienced by the Department of Defense for major procurement commodities has averaged about two points higher than the overall government index which had been in use in preparing our budget estimates. We have adopted the higher, more accurate, figures for our budget preparation and monitor its use on a periodic basis.

Wider use of independent cost estimates at all levels has also contributed to more realistic budgeting. An independent cost estimate will be submitted for all major defense acquisition programs prior to approval for entry into full scale engineering development. Program managers are now required to consider independent cost estimates in developing their budget estimates and to justify use of an estimate lower than the independent estimate. A similar requirement exists for the Service Secretaries. Independent cost analyses are also conducted by the Department's Cost Analysis Improvement Group (CAIG) for use in the program budget review. This year, independent cost analyses on 25 major programs were conducted for the budget review.

Significant progress has also been made in reducing unanticipated cost growth through better management of technological change. For example, each Service has implemented a program which quantifies the cost required to overcome development risk and program the RDT&E funds needed. In FY 1984 the Army and Navy identified $86.5M funded for this purpose. The Air Force budgets to overcome technological risk at the program manager's level.

Increasing costs due to program risk are also avoided by providing more front-end funding for test hardware. Implementation is being monitored in Defense System Acquisition Review Council (DSARC) reviews and through the approval of Test and Evaluation Master Plans (TEMPs). This year, the DSARC directed the purchase of additional test hardware for AHIP and ASW Standoff Weapon in order to reduce technological risk for these programs.

Pre-Planned Product Improvement (P^3I), a major initiative to ensure an evolutionary, lower-risk approach to system design, also contributes to the reduction of technological risk and its associated costs. P^3I is actively addressed in all DSARCs and in an increasing number of Service SARCS. Examples include the JVX engine, the 120mm gun for the

M-1 tank, incorporation of Very Large Scale Integration (VLSI) in the Airborne Self Protection Jammer (ASPJ), and incorporation of Very High Speed Integrated Circuits (VHSIC) in the AN/ALQ-131 Electronic Warfare Pod. In addition, all FY 1985 new starts were examined for potential P^3I application.

5. Improving Support and Readiness

The reduction of costs and acquisition time must be accompanied by efforts to design-in and budget for improved reliability, maintainability and support to increase the readiness of our major systems. Our long-term reliability and maintainability (RAM) objectives include improved performance in vital areas such as sortie rates, support costs, skilled manpower requirements, and deployment flexibility. Unfortunately, time will be required before we can see significant dividends from our investments in this area; nevertheless, it remains essential to begin to implement the necessary changes immediately.

Much work has been done during the past year which emphasizes readiness and sustainability at the front-end of the acquisition process. In addition to our R&D program for weapon support and logistics mentioned earlier, improved cost estimating methods and models for projecting readiness have been developed and are being applied to assist program planners. Readiness goals are now established for all major systems at Milestone I. In addition, guidance has been issued on the use of contract incentives to stimulate the improvement of design and testing performance for readiness and support.

While these important management mechanisms have been emplaced, we are continuing to monitor and support progress on readiness and support measures for systems already in more advanced stages of development. Recent DSARC reviews, for example, have directed RAM-related changes to the ASW Standoff Weapon, the Sergeant York, Division Air Defense (DIVAD) Gun System, AH-64 attack helicopter, Ground Launched Cruise

Missile (GLCM), Light Airborne Multipurpose System (LAMPS), Airborne Self Protection Jammer (ASPJ), PATRIOT air defense system, and the M-1 tank.

6. Encouraging Competition

The expanded use of competition remains a high priority initiative which is intended to help reduce costs, improve quality, and enhance the industrial base. Important progress has been made. The Services and the Defense Logistics Agency (DLA) have designated advocates for competition to insure its proper consideration during the planning process. In addition, competition goals have been set by the buying commands to provide a target to improve our level of achievements.

Emphasis has also been placed on the use of second sourcing as a means to increase the use of competition during the production phase. At the prime level, the AIM-7M, AIM-9M, IIR Maverick, F-15/F-16 engine, and HELLFIRE missile programs are using second sources for production, while selection of additional production sources is underway for the Advanced Medium Range Air-to-Air Missile (AMRAAM) program. The application of second sourcing is also being vigorously pursued at the subcontractor level for a wide variety of subsystems and components such as the F-16 canopy, and the ACES ejection seat, among others.

Efforts are currently underway to provide legislative authority for wider use of second sourcing as a means to achieve higher cost savings through price competition. Proposed legislation has been submitted to Congress to establish a negotiation exception under Section 2304 of U.S. Code, Title 10 for establishing alternative sources for the purpose of developing competition. With the support of Congress, the enactment of this provision will provide an important stimulus for enhancing competition, reducing costs, and revitalizing the industrial base.

B. SPARE PARTS PROCUREMENT REFORM

Much public attention has been focused upon the high costs and instances of abuse concerning the procurement of spare parts during the past year. Internal audits and investigations of spare parts accounts had demonstrated a need for reform. Immediate action was taken.

In July 1983, the Secretary initiated a ten-point program which broadly targeted the elimination of the types of pricing abuses that had been documented. Incentives and disincentives were introduced to eliminate abuses and reward cost saving. Monetary awards have been provided to Department personnel who have identified problems and induced cost saving procurements. Disciplinary action has been taken against individuals who have been negligent and aggressive recoupment proceedings have been initiated with companies that have overcharged.

It is important to recognize that many factors beyond the ability of the Department to control have contributed to the rising costs of spare parts. During the 1970's, inflation was a major contributing factor, as were constrained defense budgets, limited buys, the high cost of maintaining aging technology, and reduced competition within the defense industry due to the loss of several thousand defense contractors. Unfortunately, this environment also spawned streamlined spare parts management and acquisition systems and practices which offered insufficient cost controls and diluted cost consciousness. In recognition of these more complex elements, detailed process reforms were directed by the Secretary in late August.

As a result of these programs spare parts procurement is undergoing institutional change. With an inventory of 4.2 million spare parts and other secondary items worth about $53 billion, it will take time to uncover all of the systemic causes for today's problems. We have, however, begun this formidable task and we are determined to see it through.

C. FEDERAL PROCUREMENT REFORM

The Department has vigorously supported the Presidential initiative to improve Federal Procurement as described in Executive Order 12352. Indeed, the basic thrust of the Executive Order is currently being pursued under the DoD Acquisition Improvement Program. In addition, we have worked closely with the General Services Administration (GSA) and the National Aeronautics and Space Administration (NASA) to develop a Federal Acquisition Regulation (FAR).

Executive review of the FAR was completed in June, 1983 after approximately five and one-half years of effort. Publication and distribution of the FAR occurred during December, 1983. The DoD FAR supplement was published in parallel with the FAR. DoD-wide implementation efforts are phased to provide for a trained work force by April 1, 1984, the effective date of the FAR.

The Department of Defense Federal Acquisition Regulation Implementation Steering Committee was established to create a focal point for departmental FAR implementation efforts. This will ensure a smooth, timely transition from the Defense Acquisition Regulation (DAR) to use of the FAR as the principal acquisition regulation with a minimum of disruption.

D. JOINT ACQUISITION PROGRAMS

Joint acquisition programs provide an important management opportunity to achieve savings by avoiding unnecessary system duplication and achieving a greater degree of commonality among systems. Since about 30% of our modernization and investment programs involve inter-Service coordination, it is essential that we plan, manage, and evaluate joint programs in order to achieve savings and efficiencies and to integrate effectively the capabilities of the many components of the Department of Defense.

In response to the FY 1984 Defense Guidance, a comprehensive study of the Department's joint programs was conducted by the Office of the Deputy Under Secretary for Policy. The results were encouraging. Of the 77 major cross-Service programs included in the FY 1984 budget, Service Programmers reached funding agreements on all but seven. This represents successful program funding coordination for over 90% of our joint programs.

Despite this high-level of agreement, it is also evident that there is a continued need for the Secretaries, the JCS, and their staffs to review the inter-Service coordination effort. Disagreements inevitably exist among the Services, OSD, and JCS over missions, roles and practices within the context of potential joint program applications. During the CY 1982 program review, for example, major issues were raised concerning almost 20 of our joint programs. (Joint Tactical Fusion Program, MILSTAR, Joint Cruise Missile Management capability, and others.) As a result, the Defense Resources Board directed numerous changes to the joint programs in question which we are confident will result in greater efficiencies and effectiveness.

Several other important initiatives concerning joint program management are also being introduced as a result of the Defense Guidance Study:

- <u>Department-Wide Programs</u> - A Defense Resources Board (DRB) working group has been established to enhance coordination and integration among the programs of the Defense Agencies and the Military Departments. The group will monitor the development of the Agency Program Objectives Memoranda (POMs) and will serve as a forum for the resolution of minor issues not addressed by the DRB.

- <u>Cross-Command Programs</u> - The Joint Chiefs of Staff will review the information and staffing requirements of the Unified and Specified Commanders to maximize the effectiveness of their participation in the Planning, Programming, and Budgeting System (PPBS) and will develop recommendations for the Secretary of Defense.

E. INDUSTRIAL RESPONSIVENESS

The Soviets have a large and dedicated defense industry that has grown rapidly in recent years. For instance, employment in the nine defense ministries, principal producers of military equipment, rose 62% between 1965 and 1981, and floorspace in the defense industry has increased an average of 3% per year. These statistics are indicative of the long-term commitment to a strong military production base.

In contrast to the stability and growth in the Soviet defense industries, business in the U.S. sector has been cyclical and has led to instability in the industry. During 1980 and 1981 numerous studies and reports conclusively documented the deterioration of the national industrial base. Findings included symptoms such as declining productivity growth, aging facilities, materials shortages, increasing foreign dependency, skilled labor shortages, inadequate defense budgets, and often burdensome government regulations. The result was a dramatic decline in the number of contractors willing to do business with the DoD. For example, from 1967 to 1981 the number of companies involved in aerospace production declined from 6,000 to 3,500 and 1,500 of these had entered the market since 1979. Since the late 1960's, employment in the U.S. civilian aircraft industry decreased by 200,000, a decrease of 25%.

Last year we reported on some of the more significant policies and techniques we were putting into place to reverse this alarming trend and achieve increased industrial responsiveness to support current and emergency needs. I am pleased to report this year that many of these initiatives are now taking hold within the Department of Defense, defense industry, and in the various agencies of the Federal Government responsible for industrial base matters.

1. Defense Industrial Base Guidance

This far-reaching and innovative guidance is now institutionalized within the Department. The Military Services and agencies are structuring acquisition strategies which should not only reduce production lead times and the attendant costs, but should also provide improved capability to surge production of selected critical components and consumables, should that be necessary to meet emergency situations. We are now beginning to find that the costs for a built-in surge capability (e.g., doubling production within six months) for many commodities can be held to affordable levels with prudent planning by Government and industry. During this next fiscal year, we will ensure that issues of surge responsiveness and avenues for lead time/cost reduction are refined and aggressively pursued during the acquisition review process. We are also acquiring the industrial preparedness planning resources required to maintain the momentum we have achieved for industrial base capability development.

2. Defense Production Act

The Defense Production Act provides the singular legislative foundation for a number of essential programs designed to convert our peacetime economy into one which can support an intense national defense effort. It reflects the legislative fiber of this country's will to maintain a strong industrial base. Title I of the Act authorizes an industrial priorities and allocations system which gives defense contracts priority in the economy as necessary to keep programs on time. It can be rapidly expanded, if an emergency occurs. Title I is absolutely vital to the national defense.

Title III provides a variety of incentives for encouraging private sector investment in increased capacity. Title III was used extensively in the 1950's. The Department's objective is to reinstate some modest use of

Title III to create additional industrial capacity for national defense programs under those extraordinary conditions when it has been clearly demonstrated that the usual free market economic forces are insufficient to bring the needed capacity on line when required. Last year we began the first regular use of Title III of the Act. Now that the initial start-up phase is behind us and the effectiveness of the program can be demonstrated, we intend to continue our efforts to identify and remedy those problem areas that restrict the manufacture of items needed for the national defense.

To meet our defense production and cost containment commitments to the Congress, a multi-year extension of the Defense Production Act is essential.

3. Manufacturing Technology Program

This program will continue to receive priority attention because of its demonstrated high payoff record in establishing new "factory floor" manufacturing processes which reduce lead times and their attendant costs and improve productivity on a very broad national base. Recent accomplishments include: (a) a new process to manufacture high purity Gallium Arsenide material used in integrated circuits in guidance control systems for several missile systems. Actual savings to date are $4.8 million after an investment of $528 Thousand. Additional savings are expected to be another $6.6 Million; (b) a new process of electronically inspecting aircraft fastener holes is ten times faster than manual methods and is expected to provide $20 Million in savings on the C-5 wing modification alone.

4. Government-Industry Relations

An important part of our overall effort to revitalize the industrial base is the improvement of management techniques and the communication of potential defense requirements to the private sector. The following are examples of actions in this area:

- We have formed a Defense Government Property Council composed of senior executives from key staff elements that will set policies to ensure effective, efficient, and accurate management of the government's substantial investment in industrial property.

- We have updated the Defense Economic Impact Modeling System to reflect FY 1984 budget estimates. This system makes projections of defense requirements for 400 industrial sectors, 163 occupational categories, and 72 strategic materials. The outputs can be used to assist in avoiding bottlenecks in production of weapons systems.

- We have developed the Regional Occupational Planning and Educational System which considers the impact of defense expenditures on manpower demands. We hope to encourage national and regional planning for the training of skilled manpower to meet future demands.

5. <u>Industrial Productivity</u>

The declining industrial productivity growth rate in the U.S. is cause for serious concern, especially when this trend is compared to that of our foreign competitors. Improving productivity is a key element in improving our defense posture; therefore, we have developed a number of initiatives and are reemphasizing activities that have a positive effect on productivity. These include the test of the Industrial Modernization Incentives Program (IMIP) that will be used to develop and refine incentives to encourage contractor funding for productivity--enhancing capital investments. We are also strengthening our policies to eliminate unnecessary requirements in contracts, and developing improved procedures to avoid the application of premature and untailored specifications, standards, and data items in requests for proposal and contracts.

In summary, now that the economy has begun its rebound, the DoD must sustain the various programs put into place to keep our acquisitions on schedule. Over the next year we intend to complete development of our new industrial priorities system to assist contractors by assuring availability of industrial resources. In addition, we will expand our techniques of providing advance planning information to industry-at-large in order to encourage capital investments and a broader, competitive vendor/supplier base. We are very pleased with the spirit of cooperation in the Congress on resolving national industrial responsiveness issues and the growing public understanding of the need to pursue these important initiatives.

IV. MAJOR MISSION AREA INITIATIVES

In this chapter, the broad achievements, management focus, challenges, goals and objectives for the accomplishment of the Research, Development and Acquisition Program are discussed. Additional programmatic detail (cost, quantity, schedule) is available in the descriptive summaries which are provided separately.

A. STRATEGIC PROGRAMS

1. Goals/Objectives

U.S. strategic forces exist to deter nuclear or major conventional attack on the United States or its allies, as well as to counter the associated coercive power that would accrue to the Soviets if it were perceived that they could launch a successful attack upon U.S. forces. The strategic forces necessary to support this objective must be strong enough to convince the Soviet leadership that the U.S. and its allies have both the military strength and national will to protect their vital security interests. They must believe--without any doubt--that if they should ever choose to attack, the U.S. and its allies would be able to respond with sufficient force to deny Soviet military and political objectives and to bring about a prompt termination of hostilities on terms favorable to the U.S. and its allies. We must convince the Soviets of the fact that we seek realistic and lasting arms control agreements but that, without such agreements, the U.S. will pursue necessary force modernization and/or expansion. And, from a position of strength, we will continue to work for lasting arms control agreements by convincing the Soviets that their genuine security interests are best secured through equitable lower strategic nuclear force levels.

Unfortunately, the maintenance of an effective deterrent and achievement of mutual arms reduction agreements have both been made difficult by the continuing Soviet buildup in strategic and conventional armaments. Today, after 20 years of steady military buildup by the Soviet Union, and a decade of neglect by the United States, we are struggling, to restore the military equivalence necessary to preserve the peace. At the same time we are seeking a more stable force balance at much lower force levels through arms reduction agreements.

In recent years, however, the Soviets have stepped up the pace of their already ambitious strategic modernization program. Not only are they increasing the number of their systems, but they are systematically improving their effectiveness through a program of hardening, dispersal, and mobility. They have developed a new generation of ICBMs specifically designed to destroy U.S. missile silos. They continue to build far more intercontinental ballistic missiles than they could possibly need to assure effective retaliation against attack. They are well on the road toward deployment of mobile ICBMs, a new intercontinental bomber--the BLACKJACK A--even larger than our B-1B, and a complete family of long range air, sea, and ground-launched cruise missiles. Additionally a vast array of defensive systems including large ballistic missile defense radars and associated intercept missiles, the high capability SA-10 air defense system in both transportable and mobile versions, and now the advanced SA-X-12 air defense system with potential capability against aircraft and tactical ballistic missiles are under development.

Soviet SLBM forces are also being upgraded with the new TYPHOON-class submarine--larger than our TRIDENT--which carries the new SS-N-20 missile. The Soviets will maintain their almost 2:1 numerical superiority in SSBN boats with the capability to launch against targets in the U.S. from their home waters, and they are continuing their aggressive program of innovative technology in anti-submarine warfare. We believe the Soviets will in the mid 1980s deploy uprated SLBMs on their DELTA-III SSBNs and in the late 1980s deploy a follow-on to the SS-N-20 and the SS-NX-23.

Figure II-7 vividly illustrated the difficulty of maintaining a stable nuclear balance with the Soviet Union. Even with our progress toward implementation of President Reagan's 1981 Strategic Modernization Program, we must continually evaluate these efforts to ensure they can continue to provide strategic nuclear deterrence adequate to sustain the peace and prevent coercion. Soviet preoccupation with hardening, force mobility and dispersion, and massive civil defense and leadership protection further exacerbate the problem.

2. Major Achievements

In each of the five mutually supportive elements of the Strategic Modernization Program, we made significant progress over the past year. There were problems, too. However, with continued support from the Congress, we are confident in our goal of maintaining strategic nuclear deterrence. Some highlights of our accomplishments in the five major strategic areas include:

a. Survivable and Enduring C^3I Systems

We made significant progress last year in our expanding efforts to upgrade U.S. communications and control systems. Our goal is to upgrade our current capabilities to ensure high confidence in detecting, identifying, and reporting a nuclear attack under all conditions. Even more importantly, our systems must remain survivable in the event of an attack to permit a controlled and coordinated response by U.S. forces.

We moved closer in 1983 to a major goal of developing survivable CONUS long range command and control communications connectivity against disruptions caused by physical damage as well as nuclear effects under the Ground

Wave Emergency Network (GWEN) program. This is achieved through a series of proliferated relay nodes using unmanned, EMP-hardened, jam-resistant, ground wave radios. The initial connectivity capability was completed in December and the initial operational network of 57 stations--termed the Thin Line Connectivity Capability--will be operational in 1986. A much larger number will eventually become operational to provide an assured surviving and enduring backbone communications network.

Other milestones of note were contract awards to begin work on upgrading the Thule Ballistic Missile Early Warning System (BMEWS), initial production of the Nuclear Detection System (NDS) (formerly called Integrated Operational Nuclear Detonation Detection System (IONDS)), site survey work on PAVE PAWS southeast and southwest sites, and full scale development of the MILSTAR SATCOM system. MILSTAR was assigned a "BRICKBAT" priority to ensure availability of key components.

b. <u>Bomber/Tanker/Cruise Missile Forces</u>

Our major initiative in this area, the B-1B, continues in development slightly under cost and ahead of schedule. The first flight of a B-1A configured as a B-1B to test control, flight dynamics, vibration, and weapon loads was conducted late last March, and the flight test program continues. Important milestones were passed in initial fabrication of major assemblies for the first aircraft. Roll out of the first B-1B is still planned for October, 1984, with the first scheduled flight before the end of 1984. The DoE has produced the first B-83 bombs this year which are compatible with all strategic bomber aircraft, including the B-1. Developmental work on the Advanced Technology Bomber (ATB) continues on schedule for an early 1990s IOC.

An important decision was made on our cruise missile force structure by curtailing future production of the current ALCM (AGM-86B) in favor of an advanced cruise missile

(ACM) with longer range, lower observables, and improved propulsion capabilities. We have worked closely with the Congress in 1983 to develop a reasonable and efficient transition from ALCM to ACM production. Meanwhile, our AGM-86 operational test flights have been impressive.

This year we will begin the definition phase for the new Advanced Air-to-Surface Missile (AASM), which is intended to replace the aging Short Range Attack Missile (SRAM). The AASM, in conjunction with future bomber sensors and C^3I, will have the capability to place relocatable strategic targets at risk, as well as to perform the current SRAM mission of attacking fixed, hardened, and heavily defended targets at standoff ranges.

We continue to modify our remaining B-52 bombers to maintain their capabilities and allow them to carry and launch cruise missiles. In addition, we have reviewed the complete B-52 modification plan to ensure we are only proposing to do the minimum required modifications. Another significant achievement for our B-52 force included the test of anti-ship Harpoon missiles with two squadrons of B-52Gs planned for sea lane control.

The KC-135A tanker aircraft, which provides required air refueling for our strategic and tactical aircraft is also being modernized with new engines and related systems. The modernized KC-135, designated the KC-135R, will help relieve a serious shortage in air refueling capability and resolve present KC-135 operational shortcomings. KC-135R testing was completed in 1983 and aircraft modifications begin in June 1984. We are also purchasing KC-10A cargo/tanker aircraft.

c. Sea-Based Forces

We continue to make steady progress toward our goal of developing more accurate submarine launched ballistic missiles with more powerful warheads for our sea-based strategic nuclear forces. Last May, the third TRIDENT class fleet ballistic missile (FBM) submarine, the USS FLORIDA, was delivered one month ahead of schedule and the fourth, the USS GEORGIA, was delivered in January 1984, six weeks ahead of schedule. An important milestone was passed last September with a successful DSARC II for the Trident II (D-5) SLBM, and full scale engineering development began shortly thereafter. We remain on schedule to complete development, including a complete flight test program, and deploy the D-5 by the end of 1989.

d. Land-Based ICBM Forces

In our continuing efforts to improve the survivability and effectiveness of new land-based ICBMs and reduce their vulnerability, we achieved significant progress in resolving major issues on a suitable basing concept and improving overall strategic stability. The President's Commission on Strategic Forces performed an outstanding job in formulating a series of recommendations that were approved by President Reagan and forwarded to the Congress. As a result, we are now continuing development and flight testing of the PEACEKEEPER missile. Three PEACEKEEPER flight tests have already been completed. These missiles will be based in existing Minuteman silos with a planned initial operating capability in 1986. In addition, we have started development of a small, single-warhead ICBM which will lead to an IOC in 1992. Also in line with the Commission recommendations, we are continuing research on silo hardening technology, fratricide effects, and deep underground basing. This work has the potential for evolving the technology for future basing of the Peacekeeper missile as well as the new, small ICBM.

e. Strategic Defensive Forces

As a result of the initiative which President Reagan announced to the nation in his speech of March 23, 1983, we have been examining the potential contribution of defensive systems to nuclear strategy. In our preliminary study of this issue we have concluded that the pursuit of advanced defensive technologies could offer options to enhance deterrence and increase strategic stability. Effective U.S. ballistic missile defenses have the potential for significantly reducing the military utility of Soviet preemptive attacks. Such systems can strengthen deterrence and stability by increasing an attacker's uncertainties and undermining confidence in the success of his effort.

For a number of years the Soviet Union has pursued advanced ballistic missile defense technologies and is the only country in the world which maintains an operational ballistic missile defense system. Unilateral Soviet deployment of an advanced system capable of countering Western ballistic missiles--added to their already impressive air defense and passive defense capabilities--would have major, adverse consequences for our ability to deter conflict and coercion. A U.S. technology research effort on ballistic missile defenses, if successful, would provide a necessary and vital hedge against the possibility of a one-sided Soviet deployment. Such an effort could also complicate Soviet plans for modernizing their strategic offensive forces.

The successful development of an effective U.S. ballistic missile defense, combined with arms control efforts, could go a long way to realizing the President's goal of rendering nuclear weapons obsolete. Continuing research on defensive systems which offer the promise of depriving ballistic missiles of their military utility could aid in the reduction and eventual dismantling of offensive nuclear missile systems.

Even with a vigorous program to limit intercontinental missiles as a strategic threat, we cannot neglect our capabilities to respond against a Soviet attack by bombers and cruise missiles. In response to the advanced threat posed by the BLACKJACK and cruise missiles mentioned earlier, we completed the design phase of the full East Coast

Over-the-Horizon Backscatter (OTH-B) radar system and started hardware and software testing of critical subsystems. We are planning to evaluate the capability of OTH-B and other sensors for SLCM detection. The Air Force is continuing development of the Southern and West Coast coverage systems in accordance with the DoD North American Air Defense Master Plan.

In spite of some technical problems last year, we are back on track in our Anti-Satellite Missile (ASAT) program. A successful flight test was conducted in January 1984. Ambitious tests are planned this year to demonstrate the capability of the system, and we have directed a comprehensive study to select a follow-on system with additional capability to place a wider range of Soviet satellite vehicles at risk.

f. Non-Strategic Nuclear Forces

U.S. non-strategic nuclear forces (NSNF) play a central role in our defense concept as a link between our conventional and strategic nuclear forces. They help to deter a conventional attack by giving the U.S. and its allies the capability to respond to Warsaw Pact attacks in a manner of our own choosing, in order to prevent aggression from succeeding. This capability makes it impossible for the Warsaw Pact to predict accurately our response to conventional aggression, thereby increasing the risks that face them. Moreover, by putting critical enemy military installations, forces, and other targets at risk, NSNF complicate Soviet/Warsaw Pact planning for conventional aggression, thus complementing alliance conventional capabilities and strengthening deterrence in general. Especially where the potential use of our NSNF against the Soviet second echelon compels Soviet commanders to disperse their armor and other concentrated forces, the presence of our NSNFs would reduce the effectiveness of Soviet operational plans for massive attack. NSNF also deters the use of theater nuclear weapons by the Warsaw Pact by showing that the U.S. and its allies have the potential to use nuclear weapons in direct response to aggression at that level and to escalate the conflict if necessary.

For several decades, U.S. and NATO efforts to upgrade their non-strategic nuclear forces have not kept pace with Soviet theater nuclear force modernization. NATO only began deployment at the end of 1983 of Ground Launched Cruise Missiles and Pershing II are scheduled to complete deployment by 1988, unless an equitable arms control agreement is reached before then. In shorter range Intermediate Range Nuclear Force (INF) missiles, the Soviet's SS-22 and SS-23 missiles provide the Warsaw Pact with a greater range of options and firepower than NATO can field. In short-range systems, NATO and Warsaw Pact forces are about equal in the number of systems; however, Soviet and Warsaw Pact deployments of nuclear artillery have significantly upgraded their capability in this area in recent years, and when their planned deployments are complete they will enjoy a significant advantage. Without deployment in NATO of a modernized nuclear projectile for the 155mm howitzer the Soviet upgrade is even more significant.

Deployment of the initial Pershing II and GLCM systems in Europe capped difficult and complex test programs. We conducted a total of 18 PERSHING II test flights with 13 total successes, two partial successes, and only three failures. Our GLCM test program encountered minor technical problems, and after quality control difficulites were overcome we ended up with seven complete successes, two partial successes, and only one failure. It has truly been a Herculean effort to develop and get these systems operational, but, in the absence of an arms control agreement obviating the need to deploy them, the major upgrade in our theater deterrence capabilities that these systems represent is worth the effort.

The TOMAHAWK Cruise Missile program received much attention last year because of technical problems. The program was restructured to remedy technical as well as managerial concerns, and evidence confirms that the actions we took are working. Our primary concerns in the quality control/assurance area appear corrected, and we have certified the contractor for rate production of up to 25 missiles per month. The last eight engineering evaluation flights were successful and operational evaluation flight testing resumed last fall. As a measure of our renewed confidence, the USS NEW JERSEY (BB-62), one of our newly recommissioned battleships, was outfitted with eight armored box launchers (ABL) and is now deployed as a certified TOMAHAWK launch platform. Other ships and submarines are, and will be, similarly certified, including the deployment of the nuclear capable TOMAHAWK ships this year.

g. Arms Reduction Initiatives

To support our strong desire for equitable and verifiable arms control/reduction agreements, we are working actively to prepare technical support and general guidance material for both the Strategic Arms Reduction Talks (START) and the Intermediate-Range Nuclear Forces (INF) negotiations with the Soviet Union. In addition, we evaluated the technical impacts of the "build down" proposal decided upon by the President. Most importantly, we are fully supporting the President in his announced goal of not undercutting any existing arms control agreement.

h. Space

Space systems are closely associated with Strategic Forces because many of the strategic missions require global coverage which is provided more efficiently from space than earthbound systems. Spaceborne surveillance, warning, communications, meteorological, and navigation systems increase the effectiveness of military operations on the modern battlefield. Our dependence on these space systems has increased to the point that we must have an assured access to space, and the capability to insure continued space operations in time of conflict.

The Soviets are well aware of the military utility of operating in space and have committed significant resources toward a sizable space presence. The Soviets actively pursue the acquisition of Western technology and to counter this we must intensify our efforts to inhibit the possible transfer of this technology. Contrary to the image of a peaceful space program they try to convey to the world, the Soviet space program is controlled by their military. Moreover, the Soviets have committed significant resources toward an extensive space presence to support their military and political objectives. For example, the Soviets have the only operational ASAT and are developing the most extensive and flexible launch capability in the world.

In July 1982, the President issued a new National Space Policy directing a balanced civil and national security space program. Our objectives in space include: the pursuit of a vigorous R&D program to give us future options in space; expanding to space those functions that can be accomplished there better and more cost effectively; and developing an antisatellite system to assure free access to space by deterring Soviet attacks against our space systems and those of our allies, and to provide a means of negating Soviet satellites which threaten the effectiveness of U.S. land, sea and air forces. To achieve these objectives we plan to make our space systems, the satellites, the ground processing stations, and the user interfaces, more survivable from attack; improve the surveillance, communications and navigation capabilities of our space systems; and increase the robustness of our space system network by removing single nodes, procuring backup satellites, and reducing our dependency on overseas ground stations. In addition, we are also concentrating our efforts on doing more with each launch by deploying satellites with multiple missions and with much longer operational life. To optimize our deployment and on-orbit performance, we are evaluating alternate space launch capabilities, improving our space operations capabilities, and aggressively pursuing advanced, space-related technology.

3. Challenges and Opportunities

It is very clear from the behavior of the Soviets over the last three decades that they are working to acquire an increasingly formidable war fighting and war survival capability. The intensive Soviet efforts in hardening of military systems, dispersion capability for ground forces, mobility of strategic forces, and civil defense for civil and military leadership provide hard evidence of these trends. It is highly improbable that the Soviets can be deterred from continuing to aggressively pursue these goals. It is also evident that the USSR will not accept equitable arms reductions which would create a more stable and secure balance unless the U.S. maintains a vigorous strategic program intended to secure some measure of parity with the Soviets.

Thus, the road to continued peace must be a continuing, sustainable, and vigorous arms control and force modernization program to enhance strategic parity and stability with the Soviets. We cannot afford to waver in our support for strategic programs. The Soviets remain a formidable foe with steadily increasing capabilities, rarely subject to changing political trends and personalities. It is this very wavering in our support--such as in the 1970s--that provides the Soviets the incentive to increase their efforts in strategic force development to gain a strategic advantage that can be applied as coercion or a prelude to world domination. Our challenge is to maintain strong public and Congressional support for needed programs, and this is no simple task in tough economic times. It can be done, however, if we are straightforward in what we are trying to accomplish, and efficient in the manner we go about it.

B. TACTICAL WARFARE PROGRAMS

1. Goals/Objectives

Management of the Research, Development, and Acquisition activities in the Department's tactical warfare mission area requires the continuing assessment and prioritization of our programs against four principal objectives. These broad-based objectives are: (1) the achievement of a balanced military posture with the Soviet Union in conventional forces; (2) improvements to our defensive and retaliatory posture so as to deter attack by the Warsaw Pact; (3) the ability to exert a stabilizing influence in those areas of the world that are deemed of vital interest to the U.S. and our allies; and, (4) the development and acquisition of materiel capable of being used in combat across the full spectrum of possible conflicts. In measuring our manifold tactical warfare programs against these objectives, emphasis has been placed on the establishment of Joint Service Programs whenever needed, the fostering of better communications with the Services and the Congress, a stronger reliance on the ability of our NATO allies to contribute weapon systems and manpower to deter the Warsaw Pact threat, and the hardening of all weapons against nuclear, biological, and chemical environments. The following paragraphs address the broad spectrum of our acquisition programs.

2. Naval Warfare

Our achievements in the Naval Warfare mission area include the strengthening of the fleets' missile defense by fielding new systems--including AEGIS, the SM-2 Air Defense missile, the Close-In Weapon System--and improving our existing point defense system. The Maritime Anti-Air Warfare Study has provided definition for future Navy surface-to-air missile programs. This study recommended an integrated, three-phased solution for near, mid, and long range requirements. Several acquisition programs--including the Integrated Tactical Surveillance Systems Study, Air Force and Navy effort on Over-the-Horizon Radar, the AIM-54C Phoenix Missile, and the introduction of a nuclear option for the SM-2--have vital roles to play in the detection, location, and attack of enemy strike aircraft.

Significant contributors for the Anti-Submarine Warfare mission area are our Integrated Undersea Surveillance System and the Maritime Patrol Aircraft Forces equipped with P-3C Orion. We have also realized significant achievements in the S-3 Weapons Systems Improvement Program, SH-60B (LAMPS Mk III), SQR-19 Tactical Towed Array Sonar Systems, and attack submarine developments. In particular, the Submarine Advanced Combat System and a new design attack submarine will maintain our advantages over the Soviet submarine force. We are planning on the deployment of new submarine and surface ship standoff weapons with dual capability.

In the area of Anti-Surface Warfare, both the TOMAHAWK and HARPOON missile systems currently being developed are overcoming the Soviet cruise missile stand-off range advantage. Relative to Naval offensive firepower, two accomplishments are most noteworthy--the inclusion of twelve vertical launch tubes in the SSN 688 class of submarines, and the outfitting of vertical launch tubes in both CG 47 class of cruisers, the DDG 51 and the DD 963 classes of destroyers. We also plan to use the vertical launch system to fire cruise missiles against surface targets at long stand-off ranges. Lastly, surface ship gunnery is being improved by the five-inch Semi-Active Laser Guided Projectile, the Seafire Electro-Optical Fire Control System, and improved ammunition for the 16-inch guns on the Iowa class battleships.

Major objectives for the FY 1984-85 timeframe include determining means to detect and destroy the missile-launching aircraft and submarines before they can get in position to fire; providing a capability to extend our own reach to locate and attack hostile strike aircraft prior to their approaching our ships; improving anti-submarine warfare defenses including long range detection, classification and attack capabilities; continuing improvements in over-the-horizon engagements; and improving amphibious lift by procuring enough capability to simultaneously lift the assault echelons of both a Marine Amphibious Brigade and Marine Amphibious Force.

Perhaps the greatest technical challenge still lies in defeating air, surface, and submarine-launched missiles. It is most important to counter the platforms prior to missile launch in addition to having the capability to intercept the missile during its trajectory. In so doing, it is necessary to develop naval tactics which combine land and sea based assets to counter the threat to the fleet. The accomplishment of this task will require the maximum use of high technology and joint testing in the areas of sensors, guidance, propulsion, counter-targeting electronic warfare, and a complementary hard kill/soft kill approach.

3. Land Warfare

Two accomplishments are most noteworthy in the Land Warfare mission area. The first is our NATO Emerging Technology initiative wherein concepts are provided that can be exploited to strengthen deterrence in support of NATO's established strategy of flexible response and forward defense. The second is the requirement for the provisioning of materiel and equipment required by the Army's recent reconfigured combat force structure. This need is driven by the Secretary of Defense's approval of a plan to convert the Army's heavy divisions to the "Division 86" configuration. Equipment modernization and the provision of sufficient quantities of spares and repair parts to assure the required levels of readiness and sustainability rank very high in priority.

In the direct fire combat mission area, the identification of the AT-4 as the Lightweight Anti-Tank Weapon system, which will undergo additional testing as a precursor to a production decision (AT-4 or M72A3), is an important step forward. Major accomplishments in the indirect fire combat area include product improvement of the M109, 155mm Howitzer; the continued development of accurate and highly lethal 8 inch and 155mm munitions such as the Search and Destroy Armor concept, the fielding of the Multiple Launch Rocket System and the complementary development of its Terminally Guided Warhead; and, provision for a night fighting capability in the APACHE and COBRA series helicopters.

Another key program now in its initial stages of development that has high potential for the future is the Joint Tactical Missile System (JTACMS). This joint Army/Air Force program will provide a significant force multiplier for the enhancement of our capability to attack follow-on forces. We are currently evaluating the capabilities of the T-16 (Patriot derivative), T-22 (Lance derivative), and other conventional systems (such as a version of AASM) as a potential common missile for the system. An integral part of the Air Land Battle will be the development of a common airborne Joint Surveillance and Target Acquisition Radar System (JSTARS) for target detection and identification and weapons guidance. This JTACMS/JSTARS system could have application with our B-52 conventional standoff forces as well as with other theater ground and airborne assets. As a joint program, development of this highly-leveraged capability will present special problems requiring a unique blend of cooperation on sensor, missile, and platform selection.

During the past year, the Department's new initiatives in ground-based anti-air and tactical missile defense (ATM) has received continued emphasis and support. A counter-air system concept known generically as Counter-Air 90, has been circulated by the U.S. for NATO evaluation. In addition, potential weapon systems for the NATO Surface-to-Air missile filler and airfield breaker subsystems, including C^3I support are undergoing rigorous definition. In the U.S. the M2, Bradley Fighting Vehicle, and the M1, Abrams main battle tank, continue to be fielded. Initial production of the new Light Armored Vehicle and the High Mobility Multipurpose Wheeled Vehicle began during the past year.

In order to fulfill the requirements of this mission area, the following goals will strongly influence program structure and funding levels. The highest priority remains the continuation and/or initiation of procurement of essential weapon systems, with associated C^3I and electronic warfare support, to significantly improve Land Warfare effectiveness through deployment of modern equipment throughout the 1980s. Other goals of high importance include: improvements to the NATO air defense capability, including C^3I; continuation of efforts to modernize target location and threat handling systems designed to provide secure, near-real time target data collection/exploitation and discrimination; and providing a balanced mix of complementary weapons, eliminating those of marginal value and combining those with joint application potential.

The challenges and opportunities which face the Land Warfare mission area include the establishment and promulgation of programs required to counter the Soviet's tactical ballistic missile (conventional, chemical and nuclear) and decisive chemical warfare advantage, and to provide capability to disrupt and curtail enemy airfield operations and to attack Warsaw Pact follow-on forces. Our approach involves a systems engineering methodology to assess the various alternatives followed by formal program definition. The Warsaw Pact tactical missile and chemical threat to NATO airbases and high-altitude SAM batteries is substantial and is growing. Disruption of operations at Warsaw Pact airbases and airfields contingent to hostilities would greatly reduce their ability to launch sustained air attacks against NATO targets. Effective attack of the hostile follow-on forces is required to ensure that unfavorable force ratios do not result from attrition inflicted on NATO ground forces by the first echelon.

In addition, we are developing our emerging technologies into high leverage, conventional initiatives for attack of follow-on forces. These initiatives reflect the convergence of technology in the key areas of highly accurate real time targeting sensors; highly effective and accurate smart munitions to include day/night all-weather capability; digital electronic processing; and rapid highly reliable communications. This capability is essential to help offset the Warsaw Pact's numerical advantage over U.S. and allied forces.

4. Air Warfare

In the past year significant progress was made in the modernization of air-launched weapons for the Close Air Support and Interdiction missions. More specifically, we initiated the procurement of imaging infrared and laser guided Maverick and the laser guided HELLFIRE missiles. Laser guided bombs were improved by incorporating a propulsion mechanism to the Navy's SKIPPER and by the addition of low-level and adverse weather attack capability to the Air Force's Low-Level Laser Guided Bomb. The Combined Effects Munition which provides an economical attack capability against limited hard and soft area targets also entered production during this past year.

A major near term goal in the tactical air warfare area is the upgrade of our fighter force to obtain improved capability for adverse weather, day/night strike against surface targets. Our goal requires a continuing investment in aircraft, navigation, targeting systems, command and control systems, and weapons.

For the far term, the major goal in the Air Warfare area must be to maintain our ability to achieve air superiority over any future area of operations and to maintain a qualitative edge to support our outnumbered forces. To reach this goal, the DoD must continue to invest in the development of aircraft, engines and weapons that are affordable and effective replacements for current weapons systems in the 1990s. Increased support for an advanced tactical fighter is required.

The provision of adequate resources to support defense suppression--which involves the degradation/disruption and/or destruction of fixed and mobile elements of ground and sea based enemy air defense systems--is a top priority. The development and deployment of precision guided (long range stand-off) weapons is intended to help achieve this objective and will continue to receive our full support.

5. Mobility

Substantial progress is being made in reducing our current mobility shortfalls. The current prepositioning on ships of equipment to support a Marine Amphibious Brigade (MAB) is being increased to the equipment needed to support three MABs by chartering 13 new or converted maritime prepositioning ships by FY 1986. Additionally, eight SL-7 ships are being converted to roll-on/roll-off configuration to provide sealift available from CONUS, with completion of four in CY 1984, followed by four more in FY 1986. The Ready Reserve Force is being increased from its current 33 to 77 ships by FY 1988. Substantial enhancements are being made in increasing the military utility of the U.S. flag fleet and in ship off-load capability.

Our current intertheater airlift capability is well below the goal of 66 million ton miles per day. The C-5A wing modification is proceeding ahead of schedule. Wartime utilization rates for the C-5, C-130, C-141 are being increased by acquisition of additional spares and/or crews. Production of new KC-10A tanker-cargo aircraft is proceeding on schedule under a multi-year contract. Preparation for production of 50 C-5B aircraft is proceeding on schedule for delivery of the first C-5B in FY 1986. Contracts have been awarded for modification of Civil Reserve Air Fleet (CRAF) passenger aircraft to provide for quick conversion to cargo configuration in wartime. RDT&E on the C-17 is continuing, with full scale development starting in FY 1985.

In the mobility C^3I area, communications equipment is being procured to be placed on commercial ships in wartime. We are initiating a program to update the high frequency communications of Military Airlift Command aircraft. The Joint Deployment System development will be completed and operational in FY 1985. The development of the Transportation Coordinator-Automated Command and Control Information System--will be completed in FY 1985.

6. Conventional Munitions

We need to accelerate conventional munitions research, development, and acquisition programs, and to rapidly transition modern warhead, explosive, and fuze technologies into guns and howitzers, expendable ordnance, mines, torpedoes, and missiles. The Office of Munitions was established in USDRE and USDP to focus on this objective by identifying specific improvements to the existing stockpile and by vertically integrating munitions programs to transition emerging technologies into promising munition system development programs. Additionally, the Deputy Secretary of Defense directed formation of the Munitions Council to address the total munitions development and acquisition process, and to produce plans for a more effective and affordable mix of modern munitions.

7. Special Operations

The following priorities for the Special Operations mission area have been identified: insure adequacy of existing infiltration and exfiltration aircraft in support of Special Operations; provide adequate communication assets for Special Operations missions; provide a means for the rapid acquisition of unique, low volume quantities of Special Operations equipment; and, develop an improved follow-on infiltration/exfiltration aircraft.

Three significant accomplishments have been realized in the Special Operations arena. These are: infiltration/exfiltration capabilities are being enhanced through upgrades to the Combat Talon and acquisition of the Combat Talon II; initiation of an assessment of Special Operations communication equipment to lay the groundwork for an improved joint program; and, transitioning of technology to accommodate the unique and rapid reaction Research and Development needs of the Special Operations and Counter Terrorism communities.

C. COMMUNICATIONS, COMMAND, CONTROL AND INTELLIGENCE (C^3I)

1. Goals/Objectives

The establishment of a balance between our C^3I capability and the weapons and force structure that it supports continues to be our overriding goal. C^3I systems are an essential part of our overall defense capability. Not only must we provide enduring and survivable force management for our existing forces, but we must also develop longer range improvements. In addition to survivability and endurance, we also continued to stress system interoperability and security in those areas where we critically depend upon viable C^3I capabilities to carry out national defense policies. These factors are especially important in cross-Service and Joint-Service programs where our objective is to ensure that system planning, architectural guidelines and program management procedures lead to achieving needed C^3I capabilities while keeping total system costs down.

2. Major Achievements

a. Intelligence

Providing military information on foreign activities to national, departmental and tactical users is the primary mission of our intelligence programs. In support of this we have determined the investment initiatives needed to support future DoD and Director of Central Intelligence reconnaissance capabilities. We also completed the European Command intelligence baseline architecture and formed a senior executive intelligence planning committee to guide future efforts.

Our programmatic accomplishments included the fielding of the Limited Operational Capability for Europe (LOCE), for displaying of intelligence information, along with a Technical Control and Analysis Center. Both of these will assist our operational forces in evolving toward their longer term needs for a Joint Tactical Fusion program. We also initiated development of Advanced Synthetic Aperture Radar for use in attack of follow-on forces, and began an upgrade to the Ocean Surveillance Information System.

b. Strategic and Non-Strategic Nuclear Forces

In addition to the C^3I accomplishments outlined in the Strategic Programs section, the first retrofit E-4B airborne command and control system aircraft was delivered. Further, we have established policy, objectives, and principles for National Security Emergency Preparedness to be able to insure a survivable telecommunications infrastructure during periods of international tension or wartime. This preparedness will mean the availability of telecommunications for restoring critical national functions following the initiation of hostilities. Domestic and international telecommunications resources, including commercial, private and government-owned facilities are all essential parts in achieving this objective.

c. Electronic Warfare (EW)

The use of electronic warfare and C^3 countermeasures must become an integral part of our force management and weapon system capability. The lessons learned from the Falkland Islands conflict and the Israeli-Syrian encounters in the Bekaa Valley emphasized the force multiplication factor of electronic warfare. To this end we have completed a Defense Science Board report on EW and Command Support and approved the Navy's shipboard EW plan. Both of these will ensure that the EW capabilities being developed are suitable for employment in the tactical environment where the use of electronics is becoming more complex. To provide our commanders with hands-on EW experience under these field conditions, the Fleet Electronic Warfare Support Group, West Coast detachment, was inaugurated this year.

d. Theater and Tactical C^3

Our achievements in support of theater and tactical commanders encompass all aspects of the C^3 process. To counteract the known Soviet threat to our battlefield communications, we have produced and delivered to Congress a detailed communications architecture study. The Single Channel Ground Radio System (SINCGARS) radios are in production; the JTIDS Class 1 terminal began operation while full scale development continued on the Services' advanced Joint Tactical Information Distribution System (JTIDS) programs. We also initiated the Enhanced JTIDS System (EJS) to satisfy our secure, high anti-jam voice requirements against the longer term Soviet electronic warfare threat outlined in our anti-jam architecture study. A standardized transmission format for our jam resistant high frequency (HF) radios has also been agreed upon. We are also delivering the Joint Tactical Communications Program (TRITAC) circuit and message switches and have awarded contracts for digital tropospheric scatter radios, voice terminals, and associated multiplex equipment.

To assist our commanders in their force management role, improvements to our identification, navigation-position location and sensor systems have been initiated. Contracts for MARK XV and indirect identification system demonstration models and for NAVSTAR Global Positioning System (GPS) satellite multiyear production were awarded. We also are working closely with our NATO allies to ensure that the MARK XV will be compatible with European systems. The Position Location and Reporting System (PLRS) for land forces entered production and the U.S.-NATO standard configuration AWACS became operational. Six Tactical Air Operations Center (TAOC-85) operating units for airspace management were also placed under contract for the Marine Corps; the Air Force will also procure Modular Control Equipment (MCE) in this joint program. A program to adopt the international standard microwave landing system as DoD's standard precision landing system has been initiated. These programs when fully implemented will considerably improve the ability of our tactical forces to maintain accurate and timely position and status information as well as enhancing the all-weather attack and recovery capabilities of our aircraft.

e. <u>Defense-Wide Communications and Information Systems</u>

We have taken the initiative to improve many of our traditional "peacetime-only" common-user systems so that wartime stresses can be accommodated. The Worldwide Digital System Architecture was issued to provide guidance for this transition and the Joint Program Manager for the Worldwide Military Command and Control Center (WWMCCS) Information System was established to carry out the upgrading of this system. The Communications Security (COMSEC) support for our improved systems included the award of a production contract for Secure Telephone Units (STU-II), and placing the BLACKER COMSEC system in full-scale development. The communications satellite systems that support several of our mission areas were also improved. The first Defense Satellite Communications System Phase III satellite became operational and Ground Mobile Forces satellite terminals are being fielded.

f. DoD Computer Security Initiatives

The Department of Defense trusted computer systems evaluation criteria were published to allow both users and manufacturers to gauge the degree of trust that can be placed in ADP systems being considered for the processing of sensitive or classified information.

3. Challenge and Opportunities

The principal challenges and opportunities of the 1980s in the C^3I mission areas are to:

- Identify the force management needs of our new force structures and weapon systems early in the development cycle so that C^3I concepts and supporting systems can be fielded in a timely manner.

- Make the maximum use of existing C^3I capabilities through the use of mission area architectures and planning efforts that emphasize preplanned product improvements (P^3I) and evolutionary developments. Only by introducing new technology on this basis can we afford to make necessary improvements within available resources.

- Strengthen our C^3I consolidated management function by ensuring that the joint and combined Service aspects of each program are fully defined and emphasized throughout the development cycle.

- Ensure that the ultimate users of our C^3I capabilities, the commanders and their staffs, can fully and effectively utilize the hardware and software components being provided to them.

D. CHEMICAL WARFARE DETERRENCE PROGRAM

1. Goals

Our goal is to eliminate the threat of chemical and biological warfare (CBW) through verifiable arms control. Our military strategy in support of this national goal is deterrence of CBW, pending a complete and verifiable ban, through a capability to continue operations and negate military advantage to an adversary initiating use of CBW. The following initiatives are being pursued to support this goal:

a. Equip and train all appropriate U.S. forces with protective, warning, and decontamination systems to reduce degradation of individual and unit performance.

b. Supply U.S. forces with effective pretreatments, vaccines, and antidotes for CBW agents, and ensure the availability of medical forces capable of rapidly treating casualties in an integrated Nuclear, Biological, Chemical (NBC), and conventional environment.

c. Prepare to retaliate with a mix of binary munitions and agents required to deny any aggressor a significant military advantage from chemical weapons first use.

d. Establish and implement a minimum cost program for safely demilitarizing chemical munitions and agents as they lose their military utility, as they are replaced by modern systems, or to meet the terms of an arms control agreement.

2. Major Achievements

a. Leadership: We have actively led Administration efforts to reduce the threat of chemical warfare, both through arms control and through improved deterrent capability. In particular, we have led and participated in interagency groups on all aspects of chemical and biological warfare avoidance.

b. <u>Arms Control Support</u>: We have participated in both policy and technical program development and actively supported and participated in negotiations at Geneva.

c. <u>CW/BW Defense</u> - Program increases in both FY 1983 and FY 1984 have allowed significant progress in defensive capabilities.

Our individual protective equipment status was significantly improved through greater command emphasis resulting in better procurement, maintenance, and supply programs. The Army's commitment is reflected by the realignment of two general officer positions to improve management of chemical, research, development and acquisition. This past year we sponsored an American Defense Preparedness Association (ADPA) meeting resulting in greater industrial interest and recommendations for program improvements. The Navy has initiated innovative procurement procedures for protective clothing and other R&D and procurement program improvements are underway.

Our medical R&D program has been enlarged. The Army has focused one of its five R&D thrusts in biotechnology for CB antidotes, vaccines, drugs and prophylaxis. Our collective protection status continues to improve, highlighted by the installation of the first prototype citadel within a U.S. Navy ship, the amphibious assault ship LHA-3, USS BELLEAU WOOD.

d. <u>Demilitarization</u>: Our recent management study indicated the present management structure to be cost effective, but that funds for it should be identified as a separate Defense activity. Funds for the first full-scale demilitarization facility have been requested and authorized for FY 1984. A review by the National Academy of Science of stockpile safety has been initiated to assist in planning the demilitarization program.

e. <u>Retaliatory Stockpile Modernization</u>: Two Blue Ribbon Panels were formed, one reviewing the current stockpile status with respect to deterioration, and the other reviewing the BIGEYE bomb development program. The results of the panels were major factors in modifying and defending the FY 1984 stockpile modernization program. Improvements to the BIGEYE binary bomb have been developed and tested successfully to date. The stockpile maintenance program was modified to direct effort on the useful portion of the stockpile to most effectively maintain our existing deterrent status.

f. Doctrine and Training: The threat of CBW has resulted in increased study of chemical warfare, including actual field tests, using simulated agent. Chemical warfare training has been incorporated into joint exercises at all levels and has been increased by the Services. Additional guidance in the form of a JCS joint chemical concept has been completed to assist the Services in their efforts to improve doctrine. Additionally, OSD has initiated a policy review.

3. Challenges and Opportunities

a. CW/BW Defense. The need for rapid improvement justifies extraordinary effort. We must obtain expedited development and procurement programs for CW/BW defense.

b. Demilitarization: We plan to initiate construction of full-scale demilitarization facilities at Pine Bluff Arsenal and Johnston Atoll. We are researching new and cheaper methodologies to support long term objectives and ensure full support of safety and arms control goals.

c. Retaliatory Stockpile Modernization: We plan, if authorized, to initiate construction of BIGEYE bomb facilities and to initiate long lead component procurement of binary munitions, both 155mm and BIGEYE.

d. Doctrine and Training: We shall continue to develop Joint policy and concepts, and improve doctrine and training.

E. NUCLEAR WEAPONS PROGRAM

1. Goals

The goal of the nuclear weapons program is to provide and maintain an effective nuclear weapons stockpile in support of U.S. national security objectives of improved deterrence as well as greater survivability of U.S. Forces which may be subject to nuclear attack. The improvements in both strategic and nonstrategic nuclear weapons will be achieved through a combination of the following changes to the stockpile:

- Addition of new capability through application of advanced technology.
- Replacement of old or obsolescent weapons with new designs which are inherently more safe, reliable, and effective.
- Retrofitting selected weapons--already in the stockpile--with current technology to improve overall safety or utility.

There are two additional goals which are essential to a robust and effective future nuclear weapon stockpile. These are: 1) the strengthening of our technology base for nuclear weapons and weapons effects research, development, production and testing; and, 2) long range resource and requirements planning to provide for future defense needs with due regard for resource limitations and changes in requirements resulting from either a major increase in the nuclear threat or new arms control agreements.

2. Major Achievements

a. Stockpile Modernization. In cooperation with the Department of Energy, we are well underway in our program to acquire the nuclear warheads needed for the TRIDENT I, new strategic bomb, ALCM, GLCM, SLCM, 8 inch howitzer, and Pershing II. The warhead modernization programs will continue for several more years, as will development and production of new warheads and bombs for the PEACEKEEPER, TRIDENT II, and other systems. As new warheads enter the stockpile, obsolete weapons are retired. Success at the negotiating table will allow us to reduce our nuclear weapons even further.

b. Weapons Development (RD&T). We are proceeding with nuclear weapons development for strategic and non-strategic systems for both near term programs (such as the Navy's TRIDENT II and ASW/SOW systems), and for longer term efforts (such as nuclear driven directed energy weapons which show promise of future application in the defensive initiatives emphasized by the President). We have worked closely with the Department of Energy and the national nuclear research laboratories in managing these efforts, and we have revitalized the annual process of providing future nuclear weapon development guidance, with much greater participation by the Services and field organizations. The underground nuclear testing program has benefited through closer cooperation between DoD and DoE.

c. Safety. Nuclear weapons safety has been enhanced through establishment of a new policy requiring use of Insensitive High Explosive (IHE) in development of new warheads, except where overriding operational requirements preclude its use. Two major studies (Intrinsic Radiation (INRAD) and Plutonium Dispersal) have been completed and implementation actions are ongoing. Also, a major biannual nuclear accident exercise (NUWAX83) was conducted, with significantly expanded and improved participation by many Federal agencies and state officials. We are also now sharing our progress in this area with our NATO allies.

d. Security. Substantial improvements in senior level involvement and emphasis on nuclear weapons security improvements have been achieved with formation of two new management groups with our NATO partners, involving both senior leadership and staff level implementation. This stimulus has contributed to better progress on security upgrade programs now underway and those planned for the future.

e. Effectiveness/Survivability Increased effectiveness/survivability has been a fundamental factor in our decisions. A high-visibility example was the realization that all land based ICBM tasks cannot be served by a single weapon system and a single basing mode. The near-term solution--deploying PEACEKEEPER in existing silos--will reduce the Soviet advantage in ICBM capability and help deter the threat of massive conventional or limited nuclear attacks on the U.S. and its allies. For the long term, ICBM compatibility with pending U.S.-Soviet arms control agreements and the need for flexibility in responding to possible Soviet actions are very important. To address these requirements, the long-term solution includes deploying a small, single warhead ICBM in one or several basing modes, with emphasis on a mobile weapon system.

We have also begun an equally comprehensive effort to improve the effectiveness, principally survivability, of future nonstrategic systems. In addition, a broad initiative is underway to improve Electromagnetic Pulse (EMP) hardening for critical C^3 systems.

f. Interdepartmental Coordination. New Memoranda of Understanding have been completed with the DoE which update and clarify our mutual (and shared) nuclear weapon responsibilities. Additionally, we have completed a new agreement with the Department of Justice and Department of Energy on emergency response, and we are working much more closely and actively with the Federal Emergency Management Administration and the Environmental Protection Agency on several areas of mutual interest, including regulatory activities.

3. Challenges and Opportunities for the Future

The principal challenges and opportunities of the 1980s in the nuclear weapons programs are to:

- Define the new Defense Technology Goals in ways that can be applied to research and development in the near term, leading to specific military application in the future.

- Determine the feasibility and suitability of applying directed energy technology to specific weapons applications.

- Define the character of the future stockpile in view of the impact of new weapons, such as the cruise missile, on the need for tactical or strategic nuclear bombs.

- Substantially and measurably improve the survivability and endurance of our forces and support infrastructure--both in CONUS and abroad.

- Modernize capital plant and infrastructure for research, development and production, as necessary to meet long term defense needs.

F. SCIENCE AND TECHNOLOGY PROGRAM

1. Introduction

The Science and Technology (S&T) Program of the Department of Defense, augmented by the efforts of other Federal agencies and the private sector, provides the basis for the development and fielding of future weapons systems and equipment. It is not efficient or necessary for our society to support a military build-up that would match the Soviets soldier-for-soldier or weapon-for-weapon. Instead we rely on superior technology and most particularly on our ability to apply that technology to fielding superior weapon systems to offset quantitative disadvantages. Superior technology can offset our numerical inferiority within reason, but as the Soviets continue to increase their R&D efforts, they will eventually reduce our technological advantage. This is true even when we consider the contributions made by a vigorous commercial R&D effort, the Defense industry independent R&D

programs, and allies who are technologically advanced. Therefore, it is of paramount importance that the DoD, and the nation, take the necessary actions to ensure an effective and efficient S&T base upon which to build our national security.

2. Goals and Accomplishments

The S&T program covers a broad spectrum of projects of importance to DoD. The challenge is to invest in those areas where we can achieve the greatest return in terms of increased military capability. It is not practical to cover all endeavors in this section; however, I will highlight several programs both planned and underway.

The Very High Speed Integrated Circuit (VHSIC) Program is moving ahead vigorously with the insertion of high density, high performance integrated circuit chips into military systems, development of an Integrated Design Automation System which will extend VHSIC design capabilities to virtually all Defense contractors, and the development of the next generation of VHSICs which have submicron feature sizes. In addition, programs are underway to increase the yield of VHSICs resulting in ready availability at affordable costs. Each Military Service has selected several systems to receive VHSIC technology insertion funding. During FY 1985 program managers will be able to evaluate, with a minimum of risk, use of this advanced semiconductor technology, thus satisfying a primary DoD objective of reducing the time between technology R&D and its use in deployed systems.

The Software Technology for Adaptable Reliable Systems (STARS) program, a new start in FY 1984, has seen intensive activity to improve both the state-of-the-art and the state-of-practice in the development and support of software for mission critical systems. Building upon the solid foundation of the successful Ada Program (approved DoD standardized computer language), STARS will develop automated systems for the creation and continued support of software.

Organizational changes have been made to focus management attention on software technology and an OSD/Joint Service Program office has been established, along with management offices in each Service, to provide strong and coordinated management of this effort. DoD is accelerating the use of Ada now that it has been accepted as an American National Standards Institute standard and the first compilers validated. This acceleration is consistent with the urging of Congress and DoD's plans for a continuing, strong and concerted program to solve the mission critical computer software problems facing the Department.

Excellent progress has been made in the formulation and conduct of the Basic Research (6.1) program. Of particular interest are the gains that have been made toward improving DoD-university relationships. The universities perform about 50 percent of DoD basic research; are the source of our engineers and scientists; and, provide professional advice. The DoD-University Forum is successfully addressing major problems such as the exchange of scientific information and the use of university research not only for its technological capabilities but as a means toward meeting future DoD needs for scientists and engineers. We remain fully committed to the improvement of the research capability of our universities and will give emphasis to continued growth in basic research funding and to our university research instrumentation program.

The DoD Directed Energy Program, encompassing high energy lasers, particle beams, and high power microwaves, is investigating the potential of these emerging technologies to provide the basis for weapon systems in a variety of mission applications, tactical and strategic. During the past year, the Airborne Laser Laboratory has successfully demonstrated, in flight, the negation of Sidewinder air-to-air missiles and drone aircraft simulating anti-ship cruise missiles. This program is scheduled for completion in FY 1984. As a result of the Strategic Defense Initiatives, greater emphasis in directed energy technology development will be placed on potential strategic applications. The FY 1984 program, an outcome of the agreement between DoD and Congress, reflects this increased emphasis while continuing to pursue general purpose applications. The Advanced Test Accelerator will begin experiments to test theories of atmospheric propagation of charged particle beams in FY 1985. The National Tri-Service Laser Test Range will become operational with the highest power laser in the free world.

Progress is also being made in other technical areas. Metal matrix composites show great promise not only for use in large space structures but also to ensure that spacecraft can survive to perform their intended missions. The Modern Technology Demonstration Engine (5000-6000 hp class) demonstration is underway with two competitive contractors and promises 20-25 percent reduction in specific fuel consumption. Chemical defense programs have fielded a nerve agent antidote compound and have type-classified a water test kit. Also a remote detection technology and a robotic decontamination capability have been demonstrated as have regenerative filters and an individual detector and alarms. The environmental science programs have successfully developed an eye-safe, hand-held laser visibility and cloud height measuring device, are developing techniques that will allow us to infer subsurface acoustic conditions for ASW from oceanographic satellite data, and have initiated a joint U.S.-Canadian program for modern weather support hardware/software for field units. Microprocessor technologies are now being applied to low cost, portable computer based instructional and training systems being used both in classrooms and on systems such as the M-1 tank. In defensive warfare, a new phyrophoric flare has been demonstrated which exhibits a much improved broad spectrum for aircraft protection against hostile infrared missiles. And finally, efforts will increase in the biotechnology area to broaden the understanding of the basic science required to further the concept of bioelectronics. These programs provide increased capabilities to our forces.

3. The Defense Advanced Research Projects Agency (DARPA)

The traditional role of DARPA has been to accelerate technology efforts where it is perceived that technology has not moved fast enough for important military needs, and to pursue programs of high technological risk, with a potential for high payoff. The DARPA program reflects the leading edge of promising new technologies.

Recent accomplishments include demonstration of assault breaker technology via a perfect final test with five guided submunition direct hits on tank targets; demonstration of near-diffraction-limited images of Soviet low orbiting satellites; and, demonstration of radiation hardened gallium arsenide (GaAs) circuits with 1000 times greater total dose and dose rate resistance to ionizing radiation than comparable silicon circuits. In addition, a computer controlled very large scale integrated circuit (VLSIC) technique which produces chips with 300,000 active elements has been demonstrated.

During the approaching year DARPA will be engaged in important projects that could have a significant effect upon the future of our national security. These include:

- Superintelligent computers (artificial intelligence)
- Advanced cruise missile technology
- Forward swept wing flight tests
- Short wavelength laser projects including promising atmospheric compensation experiments
- Optical signal processing

- GaAs pilot production line demonstration
- Propagation of charged Particle Beams in the atmosphere.

The following are among the longer range challenges and opportunities that DARPA will be pursuing: space based laser weaponry demonstrations; background and tracking data collection from space; 1000 giga-operation per second multi-processor demonstrations; new synthetic materials from silicon polymers and short wavelength lasers with hyper-lethality. The future course of warfare may well be altered by the products resulting from the high risk, high payoff programs conducted by DARPA.

G. TEST AND EVALUATION (T&E)

1. Goals

The Director Defense Test and Evaluation (DDT&E) approves the test planning and oversees the execution and evaluation of major weapon system testing throughout the acquisition process. Most importantly, he provides a critical independent assessment of these systems to the Secretary of Defense and Defense Systems Acquisition Review Council at major decision milestones. In addition, the management of the DoD Major Range and Test Facilities Base, Joint Service Tests, and the DoD Foreign Weapons Evaluation Program are major responsibilities within DDT&E.

The Department is in the process of establishing an Office of Operational Test and Evaluation to manage the DoD operational testing process. This office will prescribe policies and procedures for the conduct of operational test and evaluation within the Department and report directly to the Secretary on the results of operational tests.

2. Major Achievements

a. Threat Simulator Developments: We have organized a tri-Service program and formed a Joint Executive Committee on Air Defense Threat Simulators to achieve improved coordination and savings within the air defense mission area. Efforts are underway to generate the best possible data base for use in simulating the latest, most capable threat air defense systems. An integrated program plan is being developed for a three track program consisting of consolidating scientific and technical intelligence, surrogate testing, and simulator developments. A Threat Simulator Master Plan has also been developed and updated to catalog requirements, inventories and shortfalls for the threat simulators needed for realistic operational testing. This data base is now being automated for more timely data collection and report production.

b. U.S. Testing in Canada Agreement: In April 1983, after several years of negotiations, we secured an agreement with Canada that permits us to test U.S. weapon systems and equipments at various Canadian test sites representative of the Central European and Eurasian landmasses. Proposals to test LANTIRN and ALCM were reviewed and accepted by the Canadian Government in July, 1983. ALCM testing is scheduled to begin during the Winter of 1984.

c. Joint Test and Evaluation (JT&E) Program: The JT&E program contains five ongoing tests in FY 1985 to examine the capability of developmental and deployed systems to perform their intended missions in a joint environment: Command, Control and Communications Countermeasures; Electro-Optical Guided Weapons Countermeasures Counter/Countermeasures; Identification Friend, Foe or Neutral; Forward Area Air Defense Evaluation; and Joint Logistics Over-The-Shore II. Three new candidate joint tests are being studied for possible initiation in FY 1985.

d. Low Fast Targets For Surface Ship Missile Threat Simulation: While no aerial target now available can duplicate the high speed, low altitude dash of threat anti-ship missiles, modified Vandal targets will provide an interim capability beginning in the last quarter of FY 1984. The operational date for a new threat representative air-launched Supersonic Low-Altitude Aerial Target has been accelerated from FY 1992 to FY 1988.

e. Foreign Weapons Evaluation (FWE) Program: The FWE program has resulted in Service selection of thirteen items of equipment or munitions for procurement in the next several years. The program instituted in FY 1980, is providing us with a very cost effective method of acquiring proven systems without high development costs and is supporting standardization objectives.

f. Test Range Modernization Program: This program is providing a significant increase in the test and evaluation resources available at the test ranges. These resources will support all phases of Development Test and Evaluation and Operational Test and Evaluation. For example, the Navy's Extended Area Test System (EATS), and the Air Force's integration facility for avionics systems testing (IFAST) will all reach IOC in 1984. These resources and other new facilities under contract for the T&E ranges will allow us to meet the challenges and satisfy the requirements of timely and comprehensive weapon systems test and evaluation.

3. Challenges and Opportunities

a. Service Preparation of Master Plans: The quality of Service Test and Evaluation Master Plans (TEMPs) has been improved but continued emphasis is required to eliminate redundant testing while ensuring completion of essential tests. TEMPs must critically examine all technical and operational testing issues before a major system can be fielded with confidence and must provide a clear correlation between these issues and program objectives on the one hand and test-verifiable goals and thresholds and risk levels on the other. We have asked the Services to improve the timeliness and quality of the TEMPs they submit, particularly in quantifying system parameters to be verified by testing. In addition, we are now requiring the Services to address test resource requirements and shortfalls in the TEMPs, and to include plans to correct existing or expected resource limitations.

b. Major Platform Testing: The long construction periods associated with ships makes it impractical to wait for test results from the first production article before deciding on production configuration of follow-on ships. Consequently, we must rely heavily on land based and sea based test beds for the information needed to make major platform acquisition decisions. The challenge we face is how to conduct realistic testing using these test beds. We are evaluating alternatives for more effective utilization of land based test beds. Interconnection and interoperation of geographically dispersed simulations and test beds is one of several potential solutions being explored.

c. Testing of Space Defense Weapon Systems: Testing of weapons systems for employment against space based threats is presently limited. A number of schemes for measuring these weapon effects are under investigation.

H. INTERNATIONAL PROGRAMS

1. Goals

The basic goal of our international cooperation and technology transfer initiatives is for friendly and allied forces of the U.S. to attain, through equitable burden sharing, the necessary military readiness, sustainability and interoperability to defend our respective nations and preserve peace throughout the world. This goal is achieved in part by facilitating the transfer of militarily critical technologies and goods when in our national interest to do so, and, conversely, controlling the export of such technologies and goods to our potential adversaries. This is in response to policies which encourage those armaments cooperation and conventional arms transfers that are essential elements of our global defense posture and indispensable components of our overall foreign policy. The intent is to help our allies and friendly nations strengthen our overall military and industrial base capabilities to improve our mutual efforts in maintaining a formidable defense posture to deter aggression.

Although we are enhancing armaments cooperation with our allies, we are also exercising proper controls for technology transfer--to preclude leakage of critical technologies that would erode our technological advantage.

2. <u>Specific Goals of International Cooperation and Technology Control are</u>:

- A credible collective non-nuclear forces capability in those areas of potential for conducting coalition operations.
- An environment which fosters maximum use of combined technological and industrial capabilities.
- An environment conducive to maintaining technological superiority over potential adversaries, which includes acceptance by Coordinating Committee members (and other transferring nations) of practical measures to protect technology from loss to potential adversaries and management of release of military-related technologies in a manner that supports U.S. security interests.

3. Major Accomplishments

a. NATO Armaments Cooperation and Defense Trade

- The broad infrastructure for cooperation continues to build as more industry-to-industry relationships are developed. The Multiple Launch Rocket System (MLRS) is an example of a U.S. system with early European involvement. The AV-8B HARRIER is an example of European systems with U.S. industrial team arrangements. The Rolling Airframe Missile (RAM) and SEA GNAT missiles are developments which cut across national lines.

- The Secretary of Defense's initiative to exploit emerging technologies to improve conventional defense is proceeding in NATO. A NATO-wide effort to exploit emerged technologies is expected to provide significant conventional capabilities within this decade, e.g., in forward defense, attack of follow-on forces, counter-air, C^3I and Counter C^3.

b. We have continued and are improving upon our technical exchanges with Israel on systems as well as technical cooperation in support of their development programs. We envision continued cooperation on the basis of the "lessons learned" operational and technical data from their combat experiences in Lebanon.

c. We recently signed a bilateral master Data Exchange Agreement (DEA) with Egypt that provides for technical exchanges in appropriate areas. Our programs of defense industrial development, e.g., 105mm ammunition production, are important first steps toward Egyptian ability to support equipments procured from the U.S.

d. Our Defense Industrial Cooperation (DIC) program with Turkey has progressed extremely well. They are rapidly acquiring the capability for F-4 aircraft maintenance and overhaul, as well as M-48 A5 tank rebuild. Additionally, their naval modernization will begin with a trilateral

Turkish, U.S. and German program to produce a German designed naval frigate equipped with U.S.-developed armaments and equipment in Turkish shipyards.

e. We are well along toward establishing an agreement with Pakistan for Defense industrial cooperation including a Scientists and Engineers Program. These agreements promise to significantly enhance their capability to economically support the equipments they are procuring from the U.S.

f. Cooperation with the Republic of Korea (ROK) has continued under the Defense Development Exchange Program (DDEP), the Professional (Scientist and Engineer) Exchange Program and the initiatives of the Technological Cooperation Committee (TCC). U.S. industry, with the concurrences of the Services, is providing technical assistance in the development of the ROK XK1 tank, a short-range maritime defense missile and a target acquisition system.

g. We have concluded with the Government of Japan an exchange of letters formalizing arrangements on the exchange of defense-related technology. This MOU provides the basis for implementing Prime Minister Nakasone's January 1983 policy statement allowing the transfer of military technology to the U.S., and for improving U.S./Japan cooperation in defense-related R&D.

h. In Australia and New Zealand, our cooperative activities focus on data exchanges and on selected projects for government sponsorship. We believe standardization and interoperability to be as important to these nations (and Japan) as for those of the North Atlantic Alliance.

i. Indonesia, the largest country in the Association of South East Asian Nations (ASEAN), has been making strides toward the modernization of its defense industries. We are working with Indonesia to implement opportunities identified for technical cooperation. Several U.S. companies are pursuing technology-oriented licensed production and co-assembly programs there.

j. U.S. export policy toward the People's Republic of China (PRC) is being liberalized within the policy of treating the PRC as a friendly but non-allied country. The PRC has been placed in a less restrictive category of the Export Administration Regulations and revised guidelines for the export of dual-use technologies have been published. DoD is working with the PRC to develop programs of cooperation in the exchange of military technologies. These programs are being designed to improve the PRC conventional defense capabilities and to enhance regional deterrence and stability.

4. Challenges and Opportunities

a. To regain our military capabilities that diminished during the 1970s in land, sea, air and space systems capabilities, it is imperative that we work with friendly governments and our allies to commit increased resources toward improving manpower skills, technological advancements, and budgetary allocations. Each of us must assume a more equitable share of the overall Defense burden. We anticipate that participation in armaments cooperation programs could lead to increased contributions to the common defense. In addition, involvement in the industrial arrangements should result in more work for their industries, less unemployment and more defense equipment for financial resources expended. These same benefits should accrue for our industries.

b. Greater participation by U.S. industries and those of our friends and allies is necessary in the international teaming aspects of armaments cooperation. The implementation of the recommendations of the recently completed Defense Science Board's report on "International Industry-to-Industry Armaments Cooperation," will enhance armaments cooperation. The establishment of the cooperative structure called for in the Roth-Glenn-Nunn Amendment has great potential to enhance the NATO nations military and economic capabilities.

c. U.S. Congressional and support of European Parliaments to reverse "protectionist policies" will be an essential element in implementation of collaborative programs and competitive Defense acquisitions.

I. TECHNOLOGY TRANSFER AND EXPORT CONTROL

1. Goals

The ability of the U.S. and its allies to deter the threat is dependent directly on the technological superiority of the West. While the Western technological lead continues to be sufficient, there is concern that the U.S. technological lead is decreasing. The erosion of our technological lead is due in great measure to the Soviets' aggressive campaign to acquire Western technology. One of our major national security goals is to halt this erosion and maintain as much of a lead in military-related system quality as possible. We must aggressively improve our technology and expeditiously incorporate new developments into our defense programs. Also, we must reduce access by our potential adversaries to our important military and critical industrial know-how.

2. Major Accomplishments

A number of concrete steps have been initiated to improve the effectiveness of DoD technology transfer export control activities. These range from integration and consolidation of major program responsibilities, to the development and implementation of the tools required within DoD for executing these responsibilities. Initiatives have been taken to improve cooperative international controls by strengthening

COCOM, and by actively pursuing bilateral control arrangements with non-COCOM Western nations. Coordinated DoD initiatives are supporting wide-ranging interagency and international control efforts and specifically assisting U.S. enforcement activities by providing special help to Project EXODUS.

a. Improved Management.

As part of the effort to raise the visibility and sharpen the focus of the technology transfer control program within the Office of the Secretary of Defense (OSD), a number of initiatives have been undertaken. We are continuing to improve the management of overall DoD technical efforts and international acquisition matters. This includes developing and administering a program to define militarily critical technologies. During the past year, coordinated DoD efforts have provided significant progress in the areas of:

- Linking technology to military capability, establishing foreign availability of technologies, and assessing specific risks/benefits of technology transfer to various categories of recipients.

- More comprehensive and systematic analysis on a case-by-case basis of technology transfer implications.

- Improved record keeping and management support using the Foreign Disclosure and Technical Information System (FORDTIS) that provides data entry, analysis, administration and management functions in support of technology transfer case processing. Currently, the system is operational at nineteen remote sites with over 40 terminals. The number of terminal sites will be increased on a scheduled basis through 1985 when 50 remote sites will be operational.

b. Outreach and Education

The Militarily Critical Technologies List (MCTL), is a basic building block of our technology program. We have continued to refine and improve the list to increase its clarity and specificity, and to remove outdated elements of technology. Industry has been a significant contributor to the MCTL's evolution, both as members of the Technical Working Groups (TWGs) and in the review of the MCTL by the Multi-Association Policy Advisory Group (MAPAG). The MAPAG review was a comprehensive balanced review, resulting in the identification of technologies to be added to the list as well as recommendations for deletions.

c. Steering Committee on National Security and Technology Transfer

A Steering Committee on National Security and Technology Transfer has been established to recommend improved procedures for managing technology transfer occurring through symposia, S&T papers, foreign participation in American research projects, and related fora. This Steering Committee will assess measures to safeguard information which warrants protection in the national security interests.

d. International Cooperation

The DoD is also involved in a wider range of activities whose primary objectives are to ensure effective multilateral control of technology shared with close allies. This includes both the improvement and strengthening of existing multilateral control mechanisms, and the development and negotiation of effective controls with other allied and neutral nations with whom such controls do not now exist.

e. High-Level Coordinating Committee (COCOM) Meeting

The COCOM is a non-treaty organization with no formal link to NATO. It operates on consensus to prohibit or restrict transfer of commodities and technologies which contribute to Soviet military capability. One of DoD's goals in the international area has been to achieve a stronger consensus between the U.S. and other COCOM countries with regard to appropriate controls over commercial transactions with the Soviet Union, Warsaw Pact countries and other non-COCOM countries. The urgent need to achieve this goal led the President to request a high-level meeting of the COCOM organization. This meeting permitted the U.S. to share its views on the military impact of technology transfer, to seek support, and to obtain a clear sense of the concerns of COCOM countries. The meeting provided a foundation for improved international cooperation on controlling technology transfer within the COCOM framework.

f. COCOM List Review

The COCOM maintains a list of commodities and technologies which all members have accepted as those which will not be exported to certain countries. The COCOM List is currently undergoing review and negotiation.

The DoD has played an active role, both in developing recommended list entries and in supporting the U.S. positions proposed in Paris during the on-going negotiations. We have updated a number of existing items and are strengthening our controls over important emerging technologies, such as robotics, metallurgy, advanced microelectronics, and computer software. In addition, DoD has sought to close many gaps and loopholes in existing COCOM coverage, and introduced new operating ideas at COCOM such as the formation of a military committee.

3. Challenges and Opportunities

a. Increase the Western technological lead through technology sharing with our allies and friends so that our collective technical strengths are realized.

b. Prevent adverse transfer of technologies, with particular emphasis on adequate procedures for the protection of militarily critical technology, including dual-use technologies.

c. Work with allied, friendly, neutral and non-aligned nations' Defense Ministers to strengthen the control of critical sensitive technologies.

d. Reduce differences among COCOM countries regarding commodities and technologies which should be prohibited from export to the Soviet Union/Warsaw Pact countries and other potential adversaries.

e. Support other U.S. and international agencies involved in the program.

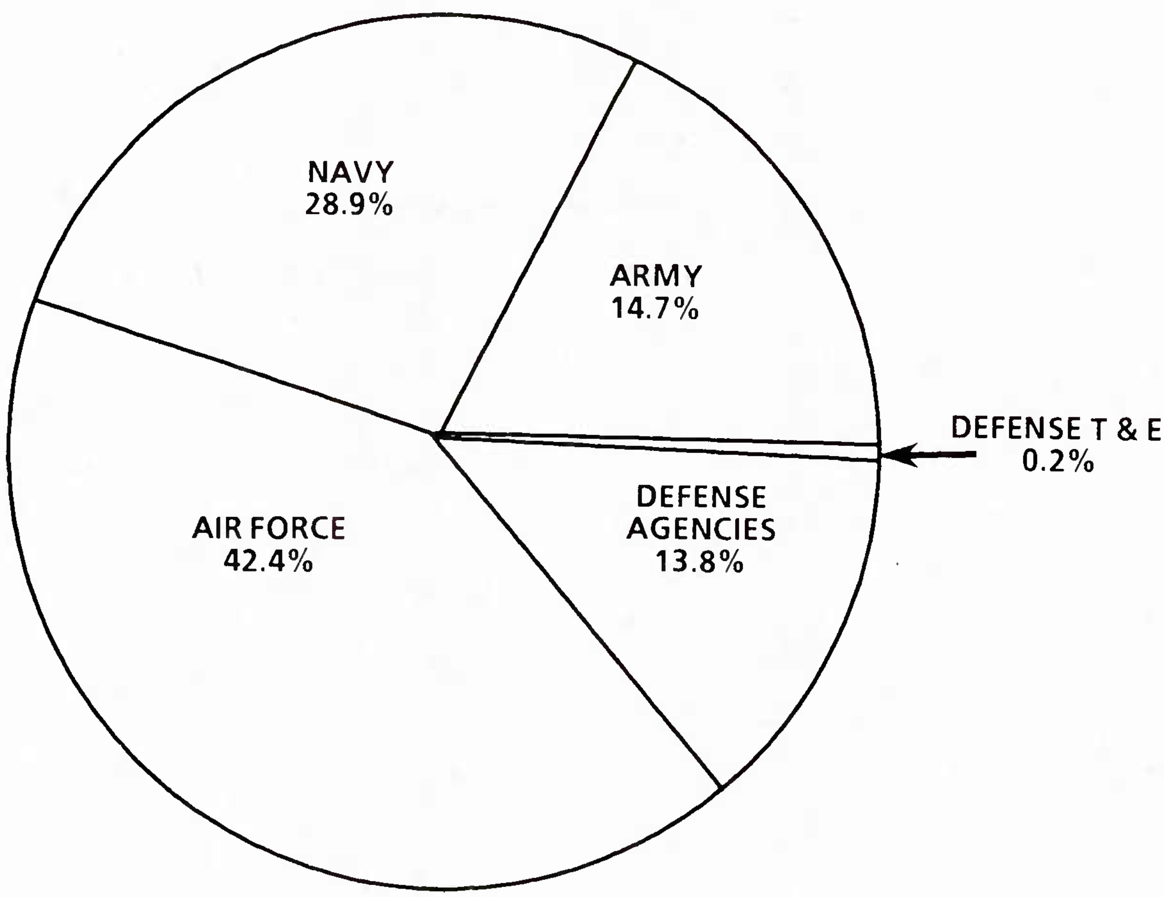
f. Expand the DoD effort in outreach and education.

APPENDIX A

OVERVIEW OF RESEARCH, DEVELOPMENT & ACQUISITION BUDGET

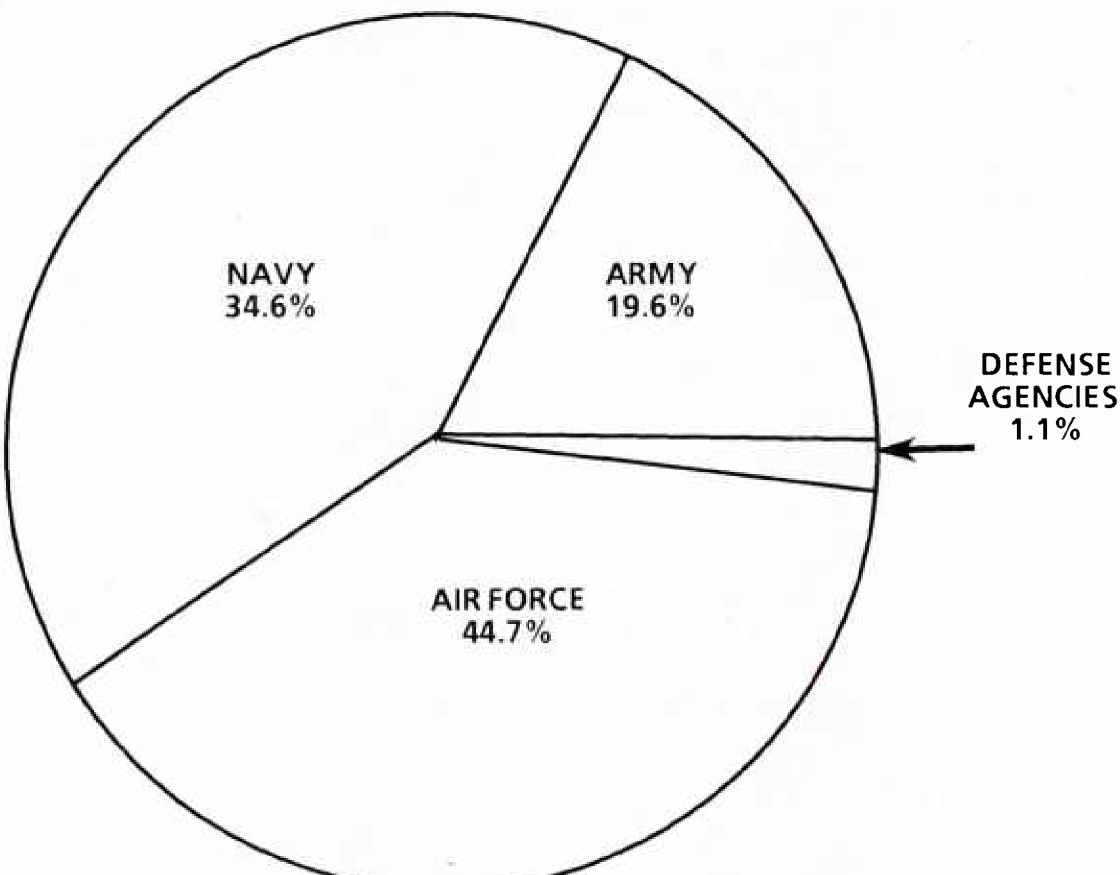
RDT&E BY COMPONENT
TOA ($ MILLIONS)
FY 1985 BUDGET ESTIMATE

	FY 1983	%	FY 1984	%	FY 1985	%
Army	3895.3	17.1	4259.4	15.8	4987.1	14.7
Navy	6100.1	26.7	7571.7	28.2	9826.1	28.9
Air Force	10621.2	46.5	12220.7	45.5	14402.0	42.4
Def Agencies	2153.2	9.5	2767.4	10.3	4707.9	13.8
Def T & E	55.0	0.2	49.0	0.2	62.0	0.2
TOTAL RDT&E	22824.8	100.00	26868.2	100.00	33985.0	100.00



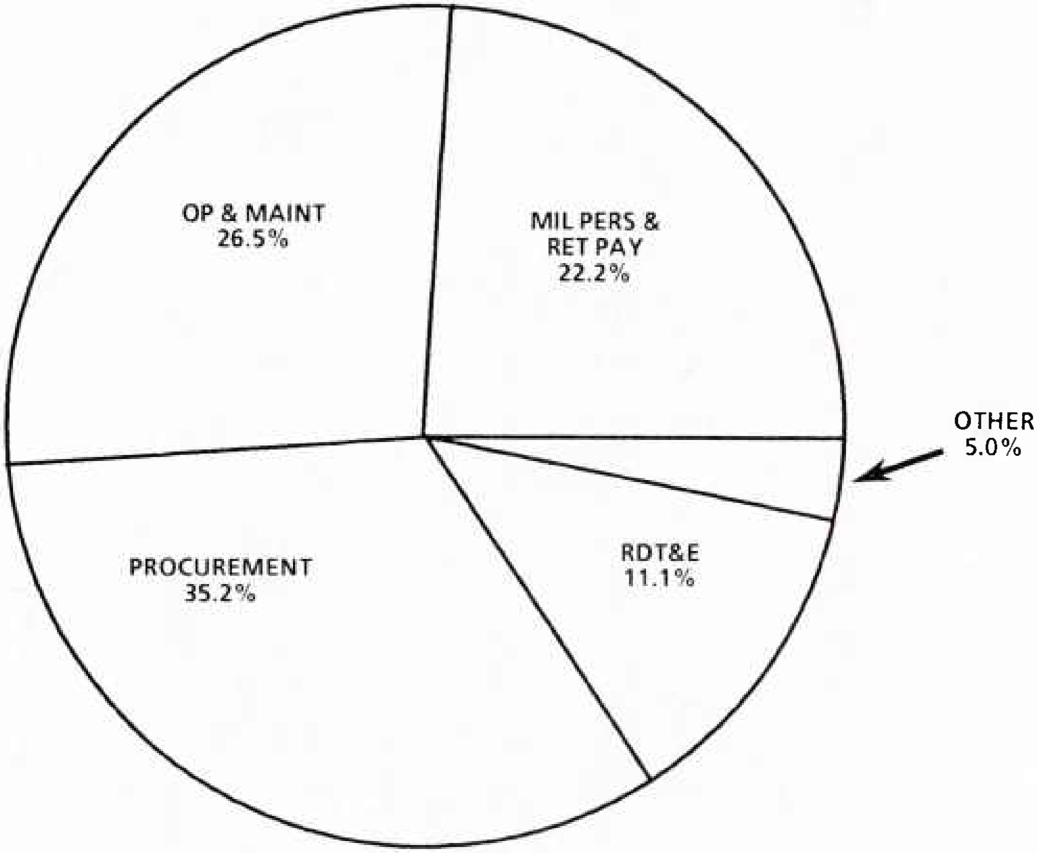
PROCUREMENT BY COMPONENT
TOA ($ MILLIONS)
FY 1985 BUDGET ESTIMATE

	FY 1983	%	FY 1984	%	FY 1985	%
Army	15,908.6	20.0	17,350.2	20.2	21,059.8	19.6
Navy	35,186.0	44.2	31,427.0	36.5	37,199.4	34.6
Air Force	27,616.5	34.6	36,095.5	42.0	48,058.6	44.7
Def Agencies	823.5	1.0	947.2	1.1	1,243.5	1.1
Natl Guard/Res Eq	125.0	0.2	176.0	0.2	--	--
Def Prod Act	--	--	--	--	25.0	--
TOTAL PROC	79,659.6	100.00	85,995.9	100.00	107,586.3	100.00



RDT&E/PROCUREMENT AS % DOD
TOA ($ MILLIONS)
FY 1985 BUDGET ESTIMATE

	FY 1983	%	FY 1984	%	FY 1985	%
Mil Personnel	45,638	19.1	48,574	18.7	50,919	16.7
Retired Pay	15,954	6.7	16,552	6.4	17,612	5.8
Oper & Maint	66,749	27.9	71,016	27.4	80,927	26.5
Procurement	79,660	33.4	85,996	33.2	107,586	35.2
RDT&E	22,825	9.6	26,868	10.4	33,985	11.1
Mil Con	4,323	1.8	4,862	1.9	7,158	2.3
Family Housing	2,685	1.1	2,678	1.0	3,165	1.0
Spec Frgn Curncy	4		3		9	
Revol & Mgt Funds	909	.4	2,525	1.0	1,762	.6
Defense Wide Contingency	--		--		2,555	.8
TOTAL DOD	238,747	100.00	259.073	100.00	305,677	100.00

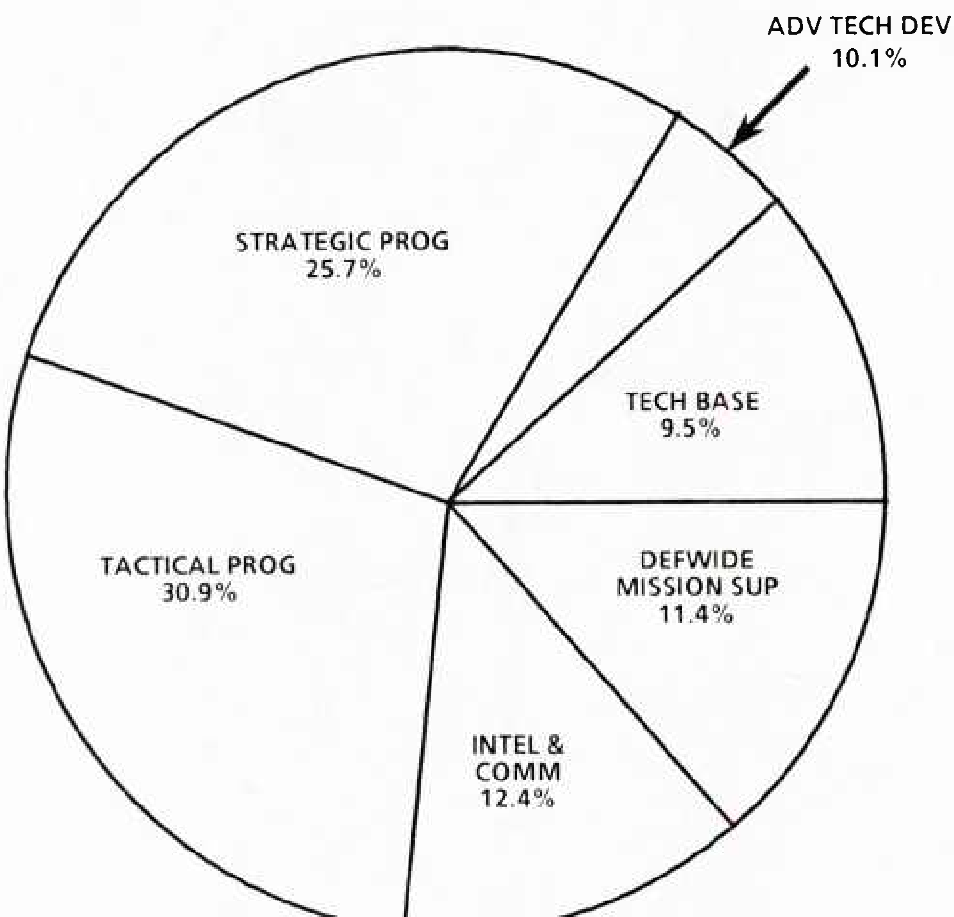


RDT&E BY BUDGET ACTIVITY

TOA ($ MILLIONS)

FY 1985 BUDGET ESTIMATE

	FY 1983	%	FY 1984	%	FY 1985	%
Technology Base	3238.1	14.2	3042.2	11.3	3226.3	9.5
Advanced Tech Dev	822.5	3.6	1386.2	5.2	3421.0	10.1
Strategic Prog	5825.2	25.5	7842.7	29.2	8735.2	25.7
Tactical Prog	7255.0	31.8	7908.7	29.4	10510.1	30.9
Intel & Comm	2708.6	11.9	3404.2	12.7	4215.7	12.4
Defwide Mission Sup	2975.4	13.0	3284.2	12.2	3876.8	11.4
TOTAL RDT&E	22824.8	100.00	26868.2	100.00	33985.1	100.00

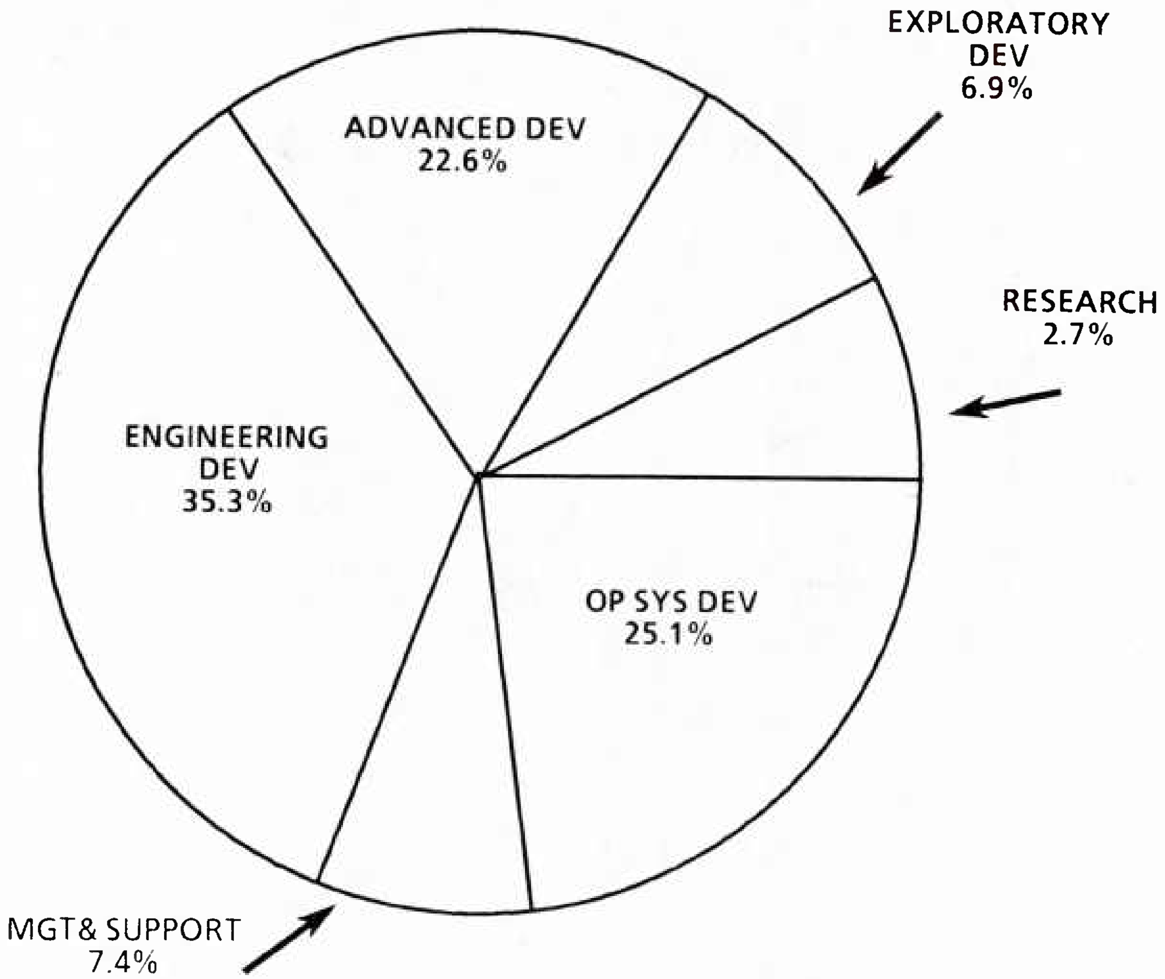


RDT&E BY R&D CATEGORY

TOA ($ MILLIONS)

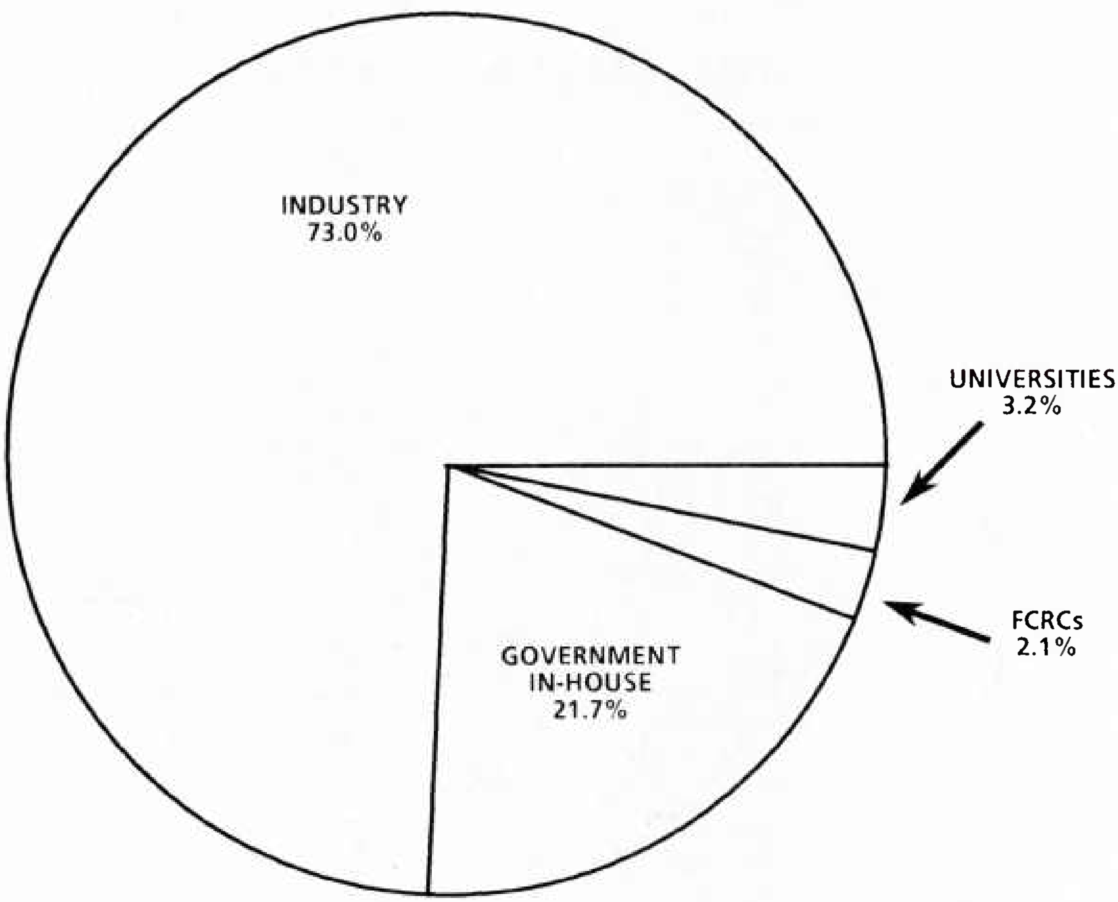
FY 1985 BUDGET ESTIMATE

	FY 1983	%	FY 1984	%	FY 1985	%
Research	787.2	3.5	839.7	3.1	899.8	2.7
Explor Dev	2450.9	10.7	2202.5	8.2	2326.9	6.9
Adv Dev	3823.7	16.8	5947.7	22.1	7693.3	22.6
Engin Dev	8628.4	37.8	9203.3	34.3	12010.4	35.3
Mgt & Sup	2242.8	9.8	2332.7	8.7	2514.7	7.4
Op Sys Dev	4891.8	21.4	6342.3	23.6	8539.8	25.1
TOTAL RDT&E	22824.8	100.00	26868.2	100.00	33985.0	100.00



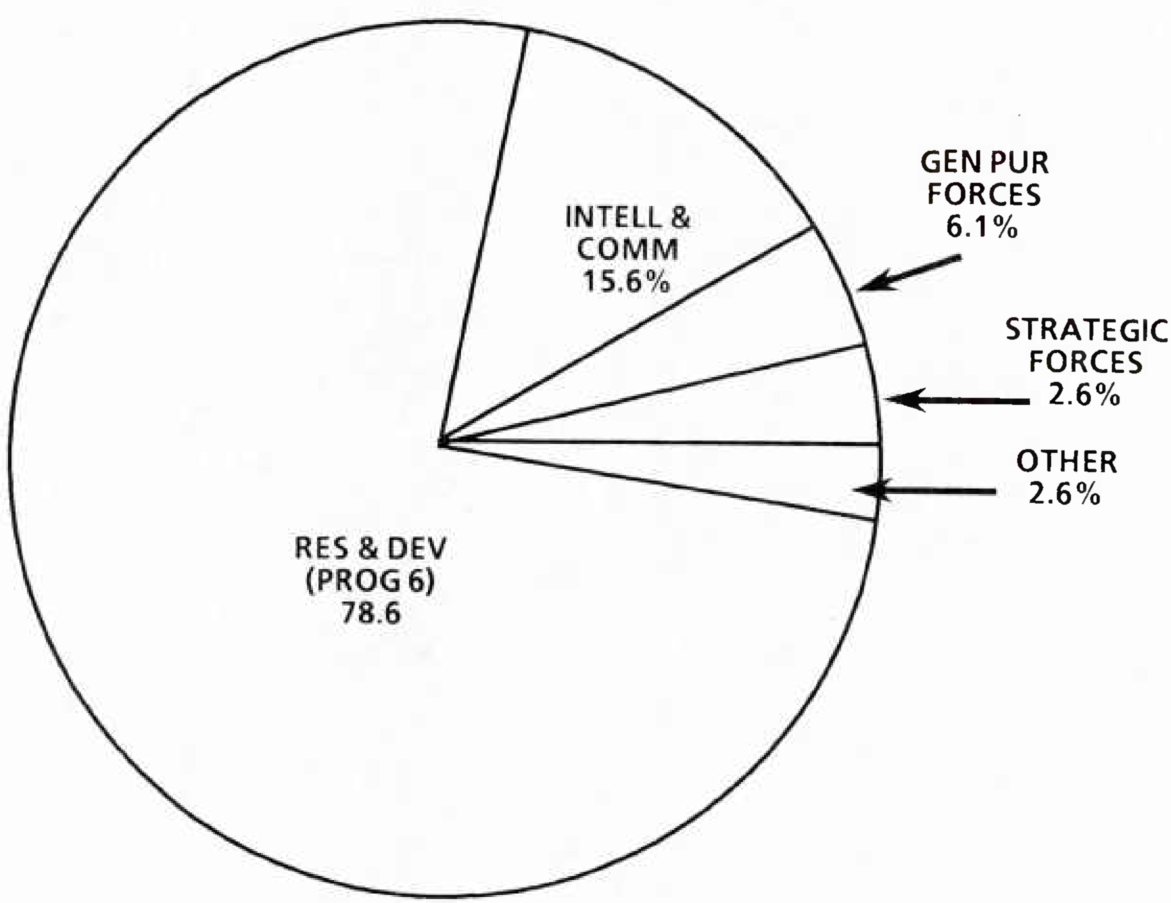
RDT&E BY PERFORMER
TOA ($ MILLIONS)
FY 1985 BUDGET ESTIMATE

	FY 1983	%	FY 1984	%	FY 1985	%
Industry	15593.3	68.3	18974.3	70.6	24820.1	73.0
Govt In-House	5797.0	25.4	6256.4	23.3	7377.3	21.7
Federal Contract Research Ctrs (FCRCs)	542.2	2.4	626.2	2.3	717.2	2.1
Universities	892.3	3.9	1011.3	3.8	1070.4	3.2
TOTAL RDT&E	22824.8	100.00	26868.2	100.00	33985.0	100.00



RDT&E BY DEFENSE PROGRAMS
TOA ($ MILLIONS)
FY 1985 BUDGET ESTIMATE

	FY 1983	%	FY 1984	%	FY 1985	%
Strat Forces	774.3	3.4	736.0	2.7	871.6	2.6
Gen Purp Forces	1174.7	5.1	1431.7	5.3	2077.1	6.1
Intel & Comm	2911.4	12.8	4091.8	15.2	5296.5	15.6
Airlift/Sealift	9.6	--	11.2	--	33.1	0.1
R & D (Prog 6)	17932.9	78.6	20525.9	76.4	25445.2	74.9
Cntr Sply & Maint	17.0	0.1	63.9	0.2	250.6	0.7
Trng, Med, Other	--	--	2.8	--	7.2	--
Spt Other Nations	4.9	--	4.9	--	3.8	--
TOTAL RDT&E	22824.8	100.00	26868.2	100.00	33985.0	100.00



PROCUREMENT BY APPROPRIATION
TOA ($ MILLIONS)
FY 1985 BUDGET ESTIMATE

	FY 1983	FY 1984	FY 1985
Aircraft Procurement, Army	2,497.9	3,273.2	4,008.3
Aircraft Procurement, Navy	10,155.5	10,164.6	11,474.2
Aircraft Procurement, Air Force	17,297.9	21,387.7	28,676.5
TOTAL AIRCRAFT PROCUREMENT	29,951.3	34,825.5	44,159.0
Missile Procurement, Army	2,683.2	2,824.1	3,442.4
Weapons (Missile) Proc, Navy	2,691.0	2,962.3	3,608.8
Missile Procurement, Air Force	4,806.6	7,811.8	9,820.6
TOTAL MISSILE PROCUREMENT	10,180.8	13,598.2	16,871.8
TOTAL SHIPBLDG/CONVERSION	16,019.3	11,437.0	13,141.9
Wpns, Trckd Cbt Veh (WTCV), Army	4,596.7	4,663.0	5,092.7
Ammunition, Army	2,123.5	1,939.9	2,494.0
Weapons (Non-missile), Navy	667.2	807.3	1,042.1
TOTAL WEAPONS/TRACKED VEH	7,387.4	7,410.2	8,628.8
Other Procurement, Army	4,007.3	4,649.9	6,022.4
Other Procurement, Navy	3,692.7	4,314.5	5,953.9
Other Procurement, Air Force	5,512.0	6,895.9	9,561.5
TOTAL OTHER PROCUREMENT	13,212.0	15,860.3	21,537.8
Procurement, Marine Corps	1,960.4	1,741.3	1,978.6
Procurement, Def Agencies	823.5	947.2	1,243.5
National Guard/Reserve Eq	125.0	176.0	--
Defense Production Act	--	--	25.0
TOTAL PROCUREMENT	79,659.7	85,995.7	107,586.4

APPENDIX B

ACRONYMS

AAH - Advanced Attack Helicopter
AAM - Anti-Air Missile
AAW - Anti-Air Warfare
AASM - Advanced Air-to-Surface Missile
ABL - Armored Box Launchers
ABM - Anti-Ballistic Missile
ACCS - Air Command and Control System
ACM - Advanced Cruise Missile
Ada - Common Name - DoD Standardized Computer Language
ADCAP - Advanced Capability
ADM - Atomic Demolition Munition
ADP - Automatic Data Processing
ADPA - American Defense Preparedness Association
AFAP - Artillery Fired Atomic Projectiles
AHIP - Army Helicopter Improvement Program
AIM - Air Intercept Missile
AIP - Acquisition Improvement Program
ALCM - Air Launched Cruise Missile
ALWT - Advanced Light Weight Torpedoe
AMRAAM - Advanced Medium Range Air-to-Air Missile
ASEAN - Association of Southeast Asian Nations
ASUW - Anti-Surface Warfare
ASAS - All Source Analysis System
ASAT - Anti-Satellite
ASD - Assistant Secretary of Defense
ASPJ - Airborne Self Protected Jammer
ASRAAM - Advanced Short Range Air-to-Air Missile
ASROC - Anti-Submarine Rocket
ASW - Anti-Submarine Warfare
ASW/SOW - Anti-Submarine Warfare/Standoff Weapon
ATB - Advanced Technology Bomber
ATF - Advanced Tactical Fighter
ATGW - Anti-Tank Guided Weapon
AUTODIN - Automatic Digital Network
AWACS - Airborne Warning and Control System
AWS - Advanced Warning System

BMD - Ballistic Missile Defense
BMEWS - Ballistic Missile Early Warning System
BW - Biological Warfare

CAIG - Cost Analysis Improvement Group
CAS - Close Air Support
CBW - Chemical, Biological Warfare
CCL - Commodity Control List
CEP - Circular Error Probable
CINC - Commander-in-Chief
CIS - Combat Identification System
CM/CAI - Computer Management/Computer Assisted Instruction
COCOM - Coordinating Committee
C^2 - Command and Control

C^3 - Command, Control and Communications
C^3I - Command, Control, Communications and Intelligence
COMINT - Communications Intelligence
COMSEC - Communications Security
CONUS - Continental United States
CNAD - Conference of National Arms Directors
CRAF - Civil Reserve Air Fleet
CSW - Conventional Standoff Weapon
CSWS - Conventional Standoff Weapon System
CTOL - Conventional Takeoff & Landing
CVA - Aircraft Carrier
CW/BW - Chemical Warfare/Biological Warfare
CW - Chemical Warfare
CY - Calendar Year
DAR - Defense Acquisition Regulations
DARPA - Defense Advanced Research Projects Agency
DCI - Director, Central Intelligence
DCS - Defense Communications System
DDT&E - Director, Defense Test and Evaluation
DDEP - Defense Development Exchange Program
DEA - Defense Exchange Agreement
DEIMS - Defense Economic Impact Modeling System
DEW - Distant Early Warning
DIA - Defense Intelligence Agency
DIC - Defense Industrial Cooperation
DIVAD - Divisional Air Defense (Gun)
DLA - Defense Logistics Agency
DMSP - Defense Meteorological Satellite Program
DNA - Defense Nuclear Agency
DoD - Department of Defense
DoE - Department of Energy
DPACT - Defense Policy Advisory Committee on Trade
DSARC - Defense System Acquisition Review Council
DRB - Defense Resources Board
DRF - Dual Role Fighter
DSB - Defense Science Board
DSN - Defense Switchboard Network
DSP - Defense Support Program

EAA - Export Administration Act
EATS - Extended Area Test System
EB - Electronic Beam
EJS - Enhanced JTIDS System
ELF - Extremely Low Frequency
ELINT - Electronic Intelligence
EMP - Electromagnetic Propagation
ENSCE - Enemy Situation Correlation Element
EPR - Economic Production Rate
EUCOM - European Command
EW - Electronic Warfare

FAR - Federal Acquisition Regulations
FBM - Fleet Ballistic Missile
FORDTIS - Foreign Disclosure and Technical Information System

FOW - Family of Weapons
FSD - Full-Scale Development
FWE - Foreign Weapons Evaluation
FY - Fiscal Year
FYDP - Five Year Defense Program

GLCM - Ground Launched Cruise Missile
GNP - Gross National Product
GOSPLAN - Soviet State Planning Organization
GPS - Global Positioning System
GRU - Soviet Military Intelligence Organization
GSA - General Services Administration
GSF - Ground Support Fighter
GWEN - Ground Wave Emergency Network

HARM - High Speed Anti-Radiation Missile
HELSTF - High Energy Laser System Test Facility
HF - High Frequency
HUD - Heads-Up Display

ICM - Improved Conventional Munition
ICBM - Intercontinental Ballistic Missile
IFAST - Integration Facility for Avionics Systems Testing
IFFN - Identification Friend or Foe/Neutral
IHE - Insensitive High Explosive
IIR - Imaging Infrared
IMIP - Industrial Modernization Incentives Program
IMINT - Imagery Intelligence
INF - Intermediate Range Nuclear Forces
IOC - Initial Operational Capability
IONDS - Integrated Operational NUDETS Detection System
IR - Infrared
IRBM - Intermediate Range Ballistic Missile
IR&D - Internal Research and Development
IRST - Infrared Search and Track
ITAR - International Traffic in Arms Regulations
ITSS - Integrated Tactical Surveillance System
IUSS - Integrated Undersea Surveillance System

JCS - Joint Chiefs of Staff
JSTARS - Joint Surveillance and Attack Radar
JTACMS - Joint Tactical Cruise Missile System
JT&E - Joint Test & Evaluation
JTIDS - Joint Tactical Information Distribution System
JTFP - Joint Tactical Fusion Program
JVX - Joint Services Advanced Verticle Lift Aircraft

KGB - Soviet Civilian Intelligence and Internal Security Group

LAMPS - Light Airborne Multipurpose System
LANTIRN - Low Altitude Navigation and Targeting System for Night
LCAC - Landing Craft Air Cushion
LEASAT - Leased Satellite
LHX - Light Helicopter Experimental

LOCE - Limited Operational Capability for Europe
LTDP - Long-Term Defense Program

MAB - Marine Amphibious Brigade
MAPAG - Multi-Association Policy Advisory Group
MCC - Mobile Command Center
MCM - Mine Countermeasures
MCTL - Militarily Critical Technologies List
MILSTAR - Military Strategic, Tactical and Relay
MIRV - Multiple Independently Targetable Reentry Vehicle
MLRS - Multiple Launch Rocket System
MOU - Memorandum of Understanding
MPA - Maritime Patrol Aircraft
MRBM - Medium Range Ballistic Missile
MRA&L - Manpower, Reserve Affairs and Logistics
MRASM - Medium Range Air-to-Surface Missile
MTI - Moving Target Indicator
MX - Missile Experimental

NASA - National Aeronautics and Space Administration
NATO - North Atlantic Treaty Organization
NBC - Nuclear, Biological and Chemical
NCA - National Command Authorities
NDRF - National Defense Reserve Fleet
NDS - Nuclear Detection System
NDSS - National Security Decision Directive
NEXRAD - Next Generation Weather Radar
NGT - Next Generation Trainer
NIS - NATO Identification System
NORF - National Defense Reserve Fleet
NSA - National Security Agency
NSDD - National Security Decision Directive
NSNF - Non-Strategic Nuclear Forces
NUWAX - Nuclear Weapons Accident Exercise

OAS - Offensive Air Support
OED - Operational Evaluation Demonstration
OJCS - Organization of the Joint Chiefs of Staff
OSD - Office of The Secretary of Defense
OSHA - Occupational Safety and Health Administration
OT - Operational Testing
OTH - Over-the-Horizon
OTH-B - Over-the-Horizon Backscatter
OTH-R - Over-the-Horizon Radar

PEP - Producibility, Engineering and Planning
PLRS - Position Location Reporting System
PLSS - Precision Location Strike System
P^3I - Preplanned Product Improvements
POM - Program Objectives Memorandum
PPBS - Planning, Programming and Budgeting System
PRC - Peoples Republic of China

RAM - Rolling Airframe Missile
R&D - Research and Development
RB/ER - Reduced Blast/Enhanced Radiation
RD&A - Research, Development and Acquisition
RDF - Rapid Deployment Forces
RDT&E - Research, Development, Test and Evaluation
ROK - Republic of Korea
RO/RO - Roll-On/Roll-Off
RRF - Ready Reserve Force
RSTA - Reconnaissance, Surveillance & Target Acquisition

SALT - Strategic Arms Limitation Talks
S&T - Science and Technology
SADARM - Search and Destroy Armor Projectile
SAM - Surface to Air Missile
SARCS - System Acquisition Review Council
SATCOM - Satellite Communications
SHORAD - Short Range Air Defense
SIGINT - Signal Intelligence
SINCGARS - Single Channel Ground Airborne Radio Systems
SLBM - Submarine Launched Ballistic Missile
SLCM - Sea Launched Cruise Missile
SM - Standard Missile
SNF - Short Range Nuclear Forces
SNM - Special Nuclear Material
SPF - Stratgegic Projection Force
SRAM - Short Range Attack Missile
SSB - Ship, Submarine Ballistic
SSB/SSBN - Ballistic Missile Submarine/Nuclear Ballistic Missile Submarine
SSGN - Cruise Missile Submarine
SSN - Nuclear Attack Submarine
START - Strategic Arms Reduction Talks
STU - Secure Telephone Unit
SUBROC - Submarine Launched Rocket

TAC - Tactical Air Command
TACAMO - Airborne Strategic Communications System
TAOC - Tactical Airborne Operations Center
T&E - Test and Evaluation
TASM - Tomahawk Anti-Ship Missile
TCC - Technical Cooperation Committee
TEMPs - Test and Evaluation Master Plans
TNF - Theater Nuclear Forces
TOW - Tube-launched, Optically-tracked, Wire-guided
TRACE - Total Risk Assessing Cost Estimating
TRITAC - Tri-Service Tactical Communications Program
TWG - Technical Working Groups

UH - Utility Helicopter

USDP - Under Secretary of Defense for Policy
USDRE - Under Secretary of Defense for Research and Engineering
USSR - Union of Soviet Socialist Republics

VHSIC - Very High Speed Integrated Circuits
VLSI - Very Large Scale Integration
VLSIC - Very Large Scale Integrated Circuits
VTX - Navy's New Advanced Trainer

WP - Warsaw Pact
WWMCCS - World Wide Military Command and Control System